Br J Sports Med 2003;**37**:370–376

PostScript

RESEARCH LETTERS

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Significant association between fluctuations in serum urate and high density lipoprotein cholesterol during exhaustive training

Physical training is generally considered to increase serum high density lipoprotein cholesterol (HDL-C) levels.[1] However, how exhaustive training influences serum HDL-C levels remains unknown. Intense exercise increases oxygen consumption and free radical formation, and induces oxidation of low density lipoprotein (LDL).[2] HDL plays an important protective role in LDL oxidation.[3] An imbalance between free radical production and antioxidants is considered to lead to oxidation of LDL and subsequent alterations in serum HDL metabolism. This study investigates changes in serum urate, which is the most important intrinsic antioxidant,[4] and serum lipids in male athletes after three weeks of exhaustive training.

We measured fasting serum lipids and urate in 11 male athletes (mean (SD) age 21.2 (2.2) years; height 168.3 (4.2) cm; body weight 65.4 (3.7) kg) before and after three weeks of exhaustive training. All the subjects performed the same intensity exercise, which consisted of a 20 (3) km run and isometric training for two hours every day for three weeks. The daily diet provided 9802 (209) kJ and consisted of about 12–15% protein, 55–65% carbohydrate, and 25–30% fat over the study period. None were taking drugs known to affect lipid and lipoprotein metabolism. Special care was taken to exclude athletes using anabolic drugs, vitamins, or other antioxidants or who were smokers. Serum lipids were measured by automated enzymatic means using Determiner TC (Kyowa Medex Co, Tokyo, Japan) for total cholesterol, AutoSera S TG-N (Daiichi Pure Chemicals, Tokyo, Japan) for triglycerides, Determiner HDL-C (Kyowa Medex) for HDL-C, and Cholestest LDL (Daiichi Pure Chemicals) for LDL-C. Serum urate was measured using the uricase calorimetric method (Fuji Co, Tokyo, Japan).

After three weeks of training, serum HDL-C levels increased in six subjects, and decreased in five (fig 1A). As expected, the changes in serum LDL-C levels were inversely associated with the change in serum HDL-C levels (data not shown). However, serum triglyceride levels were not significantly different after training in all participants (data not shown). Unexpectedly, serum urate levels decreased in all subjects with increased HDL-C levels, but increased in all with decreased HDL-C levels (fig 1B). The change in serum urate levels correlated significantly and inversely with the change in serum HDL-C levels (fig 2).

Physical activity is a widely accepted means of increasing serum HDL-C levels, and it represents a metabolic adaptation that contributes to a reduced risk of coronary heart disease.[1] However, the influence of exhaustive training on serum HDL-C levels remains obscure. Our data show that the effect of the same conditioned exhaustive training on serum HDL-C levels varies greatly among individuals.

Furthermore, we identified a significant inverse correlation between the changes in serum urate, which is the most important intrinsic antioxidant,[4] and HDL-C levels, indicating the close association between urate and HDL metabolism during exhaustive training. However, we should mention that the number of participants was limited and the detailed mechanisms underlying this phenomenon remain to be elucidated.

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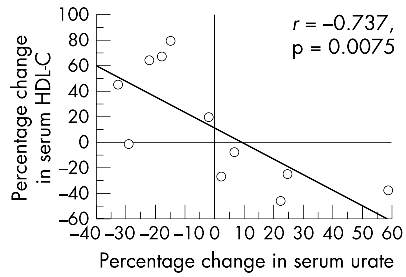

Figure 2 Correlation between percentage change in serum urate and high density lipoprotein cholesterol (HDL-C) levels. Statistical analysis was performed by Fisher's Z transformation.

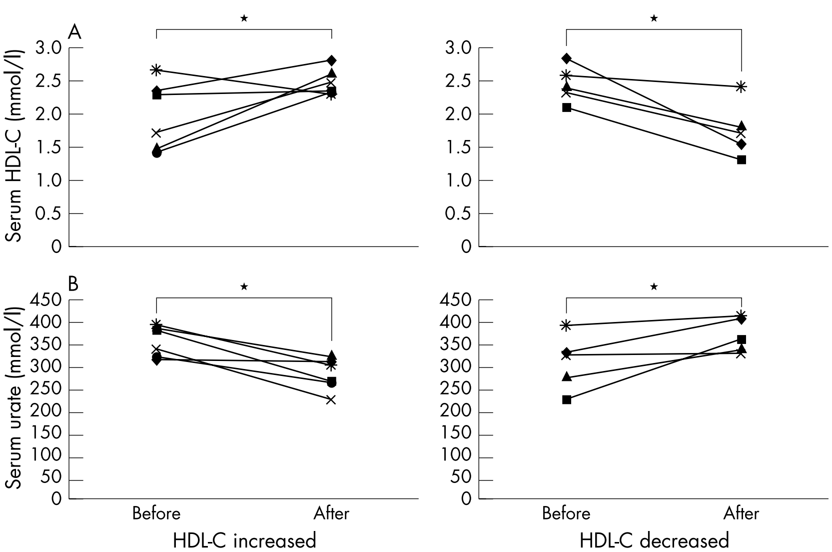

Figure 1 Changes in serum high density lipoprotein cholesterol (HDL-C) (A) and urate (B) levels in athletes with increased or decreased HDL-C levels after training. *Significant difference; p<0.05 by Wilcoxon signed rank test.

References

1 **Brownell KD**, Bachorik PS. Changes in plasma lipids and lipoprotein levels in men and women after a program of moderate exercise. *Circulation* 1982;**65**:477–84.
2 **Berg A**, Frey I, Baumstark MW, *et al*. Physical activity and lipoprotein lipid disorders. *Sports Med* 1994;**17**:6–21.
3 **Bowry VW**, Stanley KK, Stocker R. High density lipoprotein is the major carrier of lipid hydroperoxides in human blood plasma from fasting donors. *Proc Natl Acad Sci USA* 1992;**89**:10316–20.
4 **Ames BN**, Cathcart R, Schwiers E, *et al*. Uric acid provides an antioxidant defense in humans against oxidant- and radical-caused aging and cancer: a hypothesis. *Proc Natl Acad Sci USA* 1981;**78**:6858–62.

Are Reliable Change (RC) calculations appropriate for determining the extent of cognitive change in concussed athletes?

Reliable Change (RC) indices are a group of statistical techniques used in many areas of medicine to help to determine when an individual's performance on a neuropsychological test has changed from a previous assessment[1] with the same test. Recently, in sports concussion, numerous authors have advocated the application of RC analyses to neuropsychological test data collected at baseline (preseason) and after a concussion.[2,3] These authors have stated that the results of RC analyses provide the best means for guiding decisions about whether or not true change in cognitive function has occurred after a concussion, and can therefore assist the return to play decision making process. Although we support the use of RC techniques to guide decisions about concussion, we have concerns about the statistical computation and interpretation of various RC indices.

RC techniques were first described by Jacobson and Traux,[1] and were designed to aid decision making about the significance of cognitive changes in patients in whom an injury or intervention had taken place. These and subsequent authors[4,5] proposed that the most efficient way of determining whether an individual's score on a specific cognitive measure had changed was to express the magnitude of change—that is, a change score—as a function of the normal variation found for that measure. Normal variation in performance on the cognitive measure was estimated from a group of similar subjects in whom no injury or intervention had occurred. Mathematically, the individual's change in performance is expressed in the numerator, and the normal variation in performance on that measure is expressed in the denominator as follows.

Step 1: Calculate the standard error of measurement (S_E)

$$S_E = S_1(1-r_{12})$$

Step 2: Calculate the standard error of difference (SE_{diff})

$$SE_{diff} = 2(S_E^2)$$

Step 3: Calculate the RC score

$$RC = (x_2-x_1)/SE_{diff}$$

x_1 is the participant's baseline score, x_2 is the participant's follow up score, SE_{diff} is the standard error of the difference, S_E is the standard error of measurement, S_1 is the standard deviation of the control group at baseline, and r_{12} is the test-retest reliability.

Clinicians, neuropsychologists, and statisticians working with RC techniques soon realised that "true" changes in test scores could be obscured by performance changes due to practice—that is, prior exposure to a test leads to improved performance on a subsequent assessment—and also by statistical phenomena such as the reliability of the test[6] itself and the related regression to the mean. This has led to the description[7] and application[2,3] of several variants of the basic RC index. These variants have sought to provide more accurate guidance to decisions about change caused by an event by incorporating corrections for practice effects, test reliability, and regression to the mean.

The outcome of RC analyses may be interpreted statistically as a z score, with changes greater than 1.96 indicating that true change has occurred. In sport medicine, where the focus is to detect decline in performance after a concussion—that is, a one tailed hypothesis—an RC of less then −1.65 indicates that true decline has occurred.[3] One advantage of RC statistics is therefore that they can be applied immediately to individual level data, and therefore interpreted on an individual basis. This makes them applicable to clinical situations such as sports related concussion.

RC analyses were designed in accordance with conventional models of neuropsychological assessment—that is, to determine whether the change observed in the individual is true by comparing it with change that occurs normally in some matched normative data set. The problem with currently applied RC calculations is that the normal amount of variability in change over time within individuals is estimated on the basis of differences between individuals assessed at a single time point! There is no reason to believe that variation between individuals at one time point accurately represents the variation within individuals between two time points. A related problem with current RC analyses is that the normal variation represented in the denominator is termed the standard error of the difference (SE_{diff}),[1] despite the fact that it is computationally the standard deviation of the individual scores at one point in time. A true estimate of change requires the standard deviation of difference scores (SD_{diff}) in the denominator.

In sports medicine, we are in the fortunate position of having many healthy young subjects enrolled in longitudinal studies of concussion, and relatively few neuropsychological measures administered in these studies. There should be no reason why the normal change in performance over time within individuals cannot be determined directly from such control group data rather than using inappropriate estimates of variation. In fact, many researchers have obtained serial data for inclusion in RC calculations as corrections for the effects of practice observed in normal populations, including some working in sports concussion.[2,3] Although such serially acquired data are adequate for directly estimating the SD_{diff} from a normal sample, these authors have continued to use the "estimated" SD_{diff} rather than directly calculating the SD_{diff} for inclusion in the RC calculation.

Some minor alterations to previous RC calculations produces an RC calculation that is mathematically and theoretically correct, yet retains all the virtues of previously proposed RC calculation. The alterations are as follows.

Step 1: Calculate the difference scores for each individual in a control group assessed at an appropriate test-retest interval.

$$A_{diff} = (A_2-A_1)$$

$$B_{diff} = (B_2-B_1)$$

$$N_{diff} = (N_2-N_1)$$

Step 2: Calculate the sum of the squared (SUM_{SQ}) deviations from the mean difference score. This will be included in the calculation for the standard deviation of the difference score.

$$SUM_{SQ} = ((A_{diff}-\mu_{diff})^2 + (B_{diff}-\mu_{diff})^2 + \ldots + (N_{diff}-\mu_{diff})^2)$$

Step 3: Calculate the standard deviation of these difference scores (SD_{diff}). This becomes the denominator in the RC equation.

$$SD_{diff} = \sqrt{(SUM_{SQ}/(N-1))}$$

Step 4: Calculate the RC score for the individual athletes by placing the individual athlete's change score in the numerator of the RC equation, and the SD_{diff} score in the denominator.

$$RC = (x_2-x_1)/SD_{diff}$$

A_{diff} is the test-retest difference score for person A, B_{diff} is the test-retest difference score for person B, N_{diff} is the test-retest difference score for person N, μ_{diff} is the mean difference score for the control group of size N, N is the total number of paired observations, x_1 is the concussed athlete's baseline test score, and x_2 is the concussed athlete's test score after concussion.

This RC technique can be interpreted as a z score, with a change of greater than −1.65, indicating significant decline from baseline using a one tailed hypothesis. Such RC scores may also be interpreted as "effect size" calculations, very similar to Cohen's d scores as described by Zakzanis.[8] Our research group applies this calculation to neuropsychological test data gained in concussed athletes in many sports world wide and in many other medical applications where issues of change in an individual's cognitive status are pertinent.[7,9] Corrections for practice effects and other confounding variables may also be included in this calculation as per current RC techniques.

Summary

RC analyses have the potential to inform return to play decision making in cases of sports related concussion, when applied to serially acquired neuropsychological test data. However, to be applied appropriately, such calculations should endeavour to assess the magnitude of change in an individual's test score relative to change in a control group assessed at similar test-retest intervals. Previously described RC calculations do not meet this basic criterion, despite such control data being available.

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References

1 **Jacobson NS**, Traux P. Clinical significance: a statistical approach to defining meaningful change in psychotherapy research. *J Consult Clin Psychol* 1991;**59**:12–19.
2 **Erlanger D**, Saliba E, Barth JT, *et al*. Monitoring resolution of post-concussion symptoms in athletes: preliminary results of a Web-based neuopsychological test protocol. *Journal of Athletic Training* 2001;**36**:280–7.
3 **Hinton-Bayre AD**, Geffen GM, Geffen LB, *et al*. Concussion in contact sports: Reliable Change indices of impairment and recovery. *J Clin Exp Neuropsychol* 1999;**21**:70–86.
4 **Chelune GJ**, Naugle RI, Luders H, *et al*. Individual change after epilepsy surgery: practice effects and base-rate information. *Neuropsychology* 1993;**7**:41–52.
5 **Maassen GH**. Principles of defining reliable change indices. *J Clin Exp Neuropsychol* 2000;**22**:622–32.
6 **Collie A**, Darby DG, Maruff P. Computerised cognitive assessment of athletes with sports related brain injury. *Br J Sports Med* 2001;**35**:297–302.

7 **Collie A**, Maruff P, Falleti M, *et al.* Determining the extent of cognitive change following coronary artery bypass grafting: a review of statistical procedures. *Ann Thorac Surg* 2002;**73**:2005–11.
8 **Zakzanis KK**. Statistics to tell the truth, the whole truth and nothing but the truth: formulae, illustrative numerical examples, and heuristic interpretation of effects size analysis for neuropsychological researchers. *Arch Clin Neuropsychol* 2001;**16**:653–67.
9 **Darby DG**, Maruff P, Collie A, *et al.* Detection of mild cognitive impairment by multiple assessments in a single day. *Neurology* 2002;**59**:1042–6.

LETTERS

Accessory nerve injury during amateur wrestling: silent but not overlooked

A 17 year old youth presented complaining of vague chest and back pain. His medical history was unremarkable except for a sports injury three to four months previously. The injury occurred during wrestling when his opponent had fallen on his chest and neck region. On physical examination, we noted an asymmetric neckline on the right, the result of atrophy in the superior portion of the right trapezius muscle. Neck and bilateral shoulder movement, both passive and active, were not limited and were painless. There were no functional deformities such as winging scapula or drooping shoulder. No loss of motor function was detected in the right sternocleidomastoid muscle or during right shoulder elevation. Radiographic examination produced no relevant findings. We next performed electromyography (EMG), the likely diagnosis being an injury to the right accessory nerve. The needle EMG was consistent with an almost completely regenerated upper portion of the trapezius muscle compared with the contralateral side. The patient was given a regimen of shoulder strengthening exercises and followed up.

The superficial course of the spinal accessory nerve in the posterior cervical triangle makes it susceptible to injuries. The most common cause is an iatrogenic injury during surgery. Donner *et al*,[1] in a series of 83 patients with extracranial spinal accessory nerve injuries, reported the underlying causes to be lymph node biopsy in 42 cases, tumour excision in 14 cases, and carotid endarterectomy, face lift surgery, and irradiation (one case each). They also summarised the other causes as: traumatic, 13; stretch/contusion, 6; stab or glass wound, 1; shotgun, 1; compression, 1; weight lifting, 1; Hansen's disease, 1; mononeuritis, 1.

The accessory nerve is a motor nerve which innervates the trapezius and the sternocleidomastoid muscles. Interestingly, injury to this nerve does not usually result in functional loss of the latter muscle. This is usually attributed to the fact that the nerve is usually injured in the posterior triangle after it has innervated the muscle and/or the observation that the muscle receives dual input from the accessory nerve and the cervical roots.[1] Consequently, patients present with an ipsilateral trapezius palsy—that is, an asymmetric neckline, a drooping shoulder, winging of the scapula, and weakness of forward elevation[2]—immediately after or within one week of the trauma.[1]

Patient evaluation entails electrodiagnostic studies in addition to the clinical findings, EMG often showing an increase in polyphasic waves and decreased recruitment.[3] Ultrasonography has recently been proposed as an adjunct in the diagnosis.[4] Because of untoward consequences in chronic cases, surgery is recommended if patients fail to improve after one year of conservative treatment.[2 5]

We consider this case to be noteworthy in certain aspects. Firstly, the patient did not present with a trapezius palsy; it was a late silent physical finding that we uncovered. Secondly, as in a few of the cases in the above series,[1] only the upper trapezius atrophy was present which did not preclude shoulder function. This is usually because there are other innervation sources or because of the presence of a divided accessory nerve.[1 6] Thirdly, we believe that our case implies the likelihood of a relatively benign course in younger patients. Lastly, together with another case report of a wrestler,[7] the possibility of this type of injury occurring during sporting activity is highlighted. We therefore alert sports physicians to such a clinical scenario, for which prompt evaluation and management should always be the prerequisite.

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References

1 **Donner TR**, Kline DG. Extracranial spinal accessory nerve injury. *Neurosurgery* 1993;**32**:907–10.
2 **Wiater JM**, Bigliani LU. Spinal accessory nerve injury. *Clin Orthop* 1999;**368**:5–16.
3 **Di Benedetto M**, Markey K. Electrodiagnostic localization of traumatic upper trunk brachial plexopathy. *Arch Phys Med Rehabil* 1984;**65**:15–17.
4 **Bodner G**, Harpf C, Gardetto A, *et al.* Ultrasonography of the accessory nerve: normal and pathologic findings in cadavers and patients with iatrogenic accessory nerve palsy. *J Ultrasound Med* 2002;**21**:1159–63.
5 **Ogino T**, Sugawara M, Minami A, *et al.* Accessory nerve injury: conservative or surgical treatment? *J Hand Surg [Br]* 1991;**16**:531–6.
6 **Soo KC**, Hamlyn PJ, Pegington J, *et al.* Anatomy of the accessory nerve and its cervical contributions in the neck. *Head Neck Surg* 1986;**9**:111–15.
7 **Cohn BT**, Brahms MA, Cohn M. Injury to the eleventh cranial nerve in a high school wrestler. *Orthop Rev* 1986;**15**:590–5.

Applying elite research to the general population

We are writing in response to the letter by Dr Webborn[1] about our circadian research on competition swimmers.[2] His first comment, namely that the media may wrongly slant a "take home message", is understandable. Had he read our message more carefully, he would have seen that we noted that our observation—that there is a morning lowering of IgA and an increase in cortisol—"might not be acceptable to elite competitors", and that we strongly qualified it by considering that early morning sessions should: "perhaps be avoided by those returning to training after injury or illness, those close to periods of important competition (which are more associated with the underperformance syndrome) and possibly those at altitude, which itself imposes a degree of immunosuppression." All very carefully displayed in the take home message. We three authors have been involved in the preparation of elite competitors collectively for many years, and we stand by those cautionary statements.

Dr Webborn is, importantly, interested in the potential health benefits of recreational exercise to an "active population", and makes the very valid point that trivial risks of illness, as might be investigated in elite athletes, should not deflect exercise for the vastly greater public good. However, our work was concerned with well trained competition swimmers, a point that we emphasised to the media. A major thrust of sports medicine is that it sometimes looks at clinically trivial conditions—for example, ankle or wrist sprains—which may be anything but trivial to the sports competitor. More specifically, modest levels of weekly exercise may be immunoenhancing, whereas there is much evidence that elite levels of endurance training may be immunosuppressive,[3] so one always has to be careful which message applies to whom.

In his second comment, Dr Webborn reasonably queries the hydration status of our subjects. Naturally, on working with salivary flow, we had considered this also, in terms of subject behaviour at 24, 12, and 8 hours before testing, as is indicated in our experimental design. There were no "dry mouths".

However, overall, Dr Webborn has a possible point about media misuse of take home messages, and perhaps the editorial board could discuss this, if it is felt to be an issue.

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References

1 **Webborn N**. Caution re take home messages. *Br J Sports Med* 2003;**37**:187.
2 **Dimitriou L**, Sharp NCC, Doherty M. Circadian effects on the acute response of salivary cortisol and IgA in well trained swimmers. *Br J Sports Med* 2002;**36**:260–4.
3 **Sharp NCC**. Immunological aspects of exercise, fitness and competition sport. In: Macleod DAD, Maughan RJ, Williams C, *et al*, eds. Intermittent high-intensity exercise. London: E and FN Spon, 1993:201–14.

Editor's response

The role of the Journal's "take home message" had been under review for some time before this correspondence. It has already been decided that it will be changed to a highlighted box encapsulating "what is known about the topic" and "what this paper adds to the body of knowledge". This will be similar to the current layout in the *British Medical Journal*, and our technical editors have been developing a format to suit the Journal style. This correspondence has simply highlighted an important consideration of the Journal, namely how we deal with the media in a clear, concise, and appropriate way.

Response to "Berger in retrospect: effect of varied weight training programmes on strength"

I would not have believed in 1962 that my study[1] would have created such a brouhaha in the 21st century. Dr Carpinelli's paper[2] credits my study as "the genesis of the unsubstantiated belief that multiple sets are required for optimal gains in strength". His opinion is complimentary in one respect, but I cannot take full credit for it. Most professionals in the fields of athletics and therapy have added credence and support to these words by employing multiple sets in their practice and research. In my opinion, most professionals train others with multiple sets because they have experientially discovered that multiple sets are more effective than one set. Some early research studies have compared different weight training programmes, but in practically all studies multiple sets were used in training.[3–7] I am hardly the "genesis" of an "unsubstantiated belief". Historically the medical applications of strength training for therapy involve multiple sets. One set is the exception. So Berger is not as one "crying in the desert". There are many more therapists and coaches flinging down the gauntlet in support of multiple sets.

The probability level of 0.05, which academics hold so sacred in decision making, does not always supersede in importance common sense when considering the difficulties in experimentally attempting to control extraneous factors in strength research. One research problem is finding subjects who have had, preferably, no experience in weight training and who are able to train for long periods of time, well beyond 12 weeks, under controlled conditions. If I had concluded in my study in 1962 that one set was as good as multiple sets, I would have had more than just Dr Carpinelli voicing criticism of my paper. The practitioners in the field would have confronted me years ago to express their disagreement and would not have waited 40 years to do so.

A person who comes to my mind as one having promoted single sets in past years is Arthur Jones, the developer of the Nautilus machine. To my knowledge, he has never presented any acceptable scientific evidence supporting his belief. Furthermore, he has few adherents today of his training views, although one adherent is obvious. Of the 85 references in Dr Carpinelli's paper, Mr Jones authored not one. Certainly his contribution to the body of knowledge in strength training should be recognised, if deserving.

I decided to deal with a limited amount of "evidence" in defence of my study. But I must preface my remarks by assuring the readers that my paper was reviewed by several researchers at the time of acceptance and approved by them for publication. The conclusions I drew were substantiated and accepted by them. For Dr Carpinelli to refer to my study as the "genesis of the unsubstantiated belief . . ." runs counter to the opinions of these reviewers.

The data in tables 1, 2, and 3 of Dr Carpinelli's paper, which were used to critique my study, were inappropriately used according to acceptable statistical protocol. Comparisons between subgroups I-2, III-6, etc were not valid for critiquing my study. When a factorial design is used, as in my study, and no significant interaction is found between factors of sets and repetitions, then the only legitimate analysis to make is on main effects—that is, comparisons among sets 1, 2, and 3 across all levels of repetitions, and among repetitions 2, 6, and 10 across all levels of sets. When this was done, significant differences were found, with three sets and six reps resulting in the greatest improvement. I spoke to Dr Carpinelli earlier (1998 communication) about his misuse of statistics and suggested he consult a statistician. If this had been done, there would not have been a critique of my study, nor a need for one. I must admit, though, that I made the same mistake as Dr Carpinelli in my study. In table 4 of my study, I erroneously made comparisons among subgroups of sets and repetitions. However, as a neophyte in 1962 I accept the blame. Being wiser today than 40 years ago, and even considering Dr Carpinelli's critique, I unequivocally support multiple sets over single sets for optimising strength. I would suggest to Dr Carpinelli that he conduct research of his own in the hope of gaining support for his position. If his zealousness, which is commendable, were redirected to research rather than to critiquing old studies, his academic contributions would be more fruitful.

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References

1 **Berger RA**. Effect of varied weight training programs on strength. *Res Q* 1962;**33**:168–81.
2 **Carpinelli RN**. Berger in retrospect: effect of varied weight training programmes on strength. *Br J Sports Med* 2002;**36**:319–24.
3 **DeLorne TL**, Schwab RS, Watkins AL. The response of the quadriceps femoris to progressive resistance exercises in poliomyelitic patients. *J Bone Joint Surg [Am]* 1948;**30**:834–47.
4 **Krusen EW**, Jr. Functional improvement produced by resistance exercise of quadriceps muscles affected by poliomyelitis. *Arch Phys Med Rehabil* 1949;**30**:271–7.
5 **McGovern RE**, Luscombe HB. Useful modifications of resistance exercise techniques. *Arch Phys Med Rehabil* 1953;**34**:475–7.
6 **McMorris RO**, Elkins EC. A study of production and evaluation of muscular hypertrophy. *Arch Phys Med Rehabil* 1954;**35**:420–6.
7 **Hellebrant FA**, Houtz SJ. Mechanisms of muscle training in man. *Phys Ther Rev* 1956;**36**:371–83.

Will the new field hockey rules lead to more injuries?

On 1 January 2003, the International Hockey Federation introduced a mandatory experimental amendment to the rules pertaining to the taking of short corners. The new rule now reads "Penalty corner: no shot at goal shall be made until the ball has travelled outside the circle".[1] This change means it will no longer be necessary for attackers to stop the ball before taking a shot at goal as was previously the case. The reason given for introducing the rule was to "simplify the game without altering the overall nature of something which is unique to hockey".[1]

Short corners present a good opportunity to score a goal and are practised routinely in training. The new ruling was introduced on 1 March 2003 by the Ulster Branch of the Irish Hockey Association in whose leagues I play. I have now played three games under the new ruling, and the danger of this rule has been brought sharply into focus. In two of the three games, players required hospital attention because of knee and ankle injuries as a result of defending a short corner. It is normal practice that the defenders advance from the goal line to prevent the attacking team shooting, once the ball has been hit. The twin effect of running towards the striker and the decreased time required to take a shot, as a result of the attacking team not being required to stop the ball, leaves defenders with very little reaction time to avoid been struck by an incorrectly hit ball which may rise off the ground. In lower leagues, hitting technique is often less well developed and it is common for the ball to be lifted during a shot.

Concern has been expressed at the number of facial injuries in hockey,[2] and it is my belief that the rate of injuries (both facial and other) will increase as a result of this new rule, some of which may be severe.

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References

1 **International Hockey Federation**. *Rules of Hockey 2003*. Belgium: International Hockey Federation, 2003.
2 **Murtaugh K**. Injury patterns among female field hockey players. *Med Sci Sports Exerc* 2001;**33**:201–7.

BOOK REVIEWS

Complementary therapies for physical therapists

Edited by R A Charman. Oxford: Butterworth-Heinemann, 2000, £32.99, pp 301, softcover. ISBN 0 7506 4079 0

Public interest in complementary therapies has increased dramatically in the last few decades, with many of the new treatment methods of potential interest to physical therapists and their patients. This is therefore a timely volume.

It comprises some 23 chapters complemented by 11 extra chapters available via the internet. The authors are not well known to me, but they clearly each have a special interest in their chosen topic.

After an initial and intellectually challenging chapter on "Energy medicine", which a physicist would have difficulty accepting, the authors present a primarily theoretical approach to a wide range of alternative therapies. Some, such as acupuncture, Feldenkrais, and myofascial release, have gained some acceptance among physiotherapists, whereas others, including therapies involving the Chakra system, reflexology, flower essences, and electro-crystal therapy, remain firmly on the fringe of modern practice.

In the foreword, we are asked to read critically and consider the evidence for the various approaches presented. An excellent suggestion but very difficult to do from the material presented! The authors cover the theory behind the techniques in some detail, but there is little to support their assertions. Those looking for an evidence based text will be disappointed. While reading each chapter, I spent much of my time peering at the reference lists. Most of the references were to books, unpublished reports, or publications in obscure journals. This was disappointing. In fact in chapter 4, "Healing by intention: a research-based overview", any references to trials of this form of healing were in other than mainstream medical journals. This form of referencing makes a fair assessment of the evidence frustratingly difficult.

This book is useful mainly as an introduction to the very theoretical but generally very poorly researched field of complementary therapies in physical therapy. The basic problem is that it is heavy on theory, mainly unsubstantiated, and light on evidence of efficacy. It did not convince me to recommend the majority of the therapies to my patients.

More positively, this book is well written and easy to read. I clearly learned much about the subject matter, the validity of much of which I found questionable. However, it would be useful in educating physical therapists about treatments that they may be asked about or choose to trial. As it appears to be the only book of its kind, it should be held as a reference text at institutions involved in the teaching of physical therapies.

Analysis

Presentation	16/20
Comprehensiveness	17/20
Readability	15/20
Relevance	6/20
Evidence basis	3/20
Total	57/100

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Science for exercise and sport

Edited by C A Williams, D V B James. Philadelphia: Routledge Taylor & Francis Group, 2001, £17.99, pp 176. ISBN 0 419 25170 7

The basic scientific principles and working techniques relevant for science in the field of exercise physiology and exercise and sport sciences are described in this book. It is written for undergraduate students with minor or no experience and knowledge in science.

The book is divided into three sections. The first section covers the physical states of gas, liquid, and solid. The second explains forces, energy, and electricity. The third addresses data analysis and report writing. Each chapter starts with a list of learning objectives, a short introduction which highlights the relevance for sports and exercise. So called "action points" enable the reader to check the learning success. A conclusion briefly summarises the take away message, and "key points" condense the latter to its essence. Each chapter is completed with a list of references, but also examples of additional recommended literature for further reading.

In general, the structure of the book is systematic, consistent, and in principle helpful, and the content covers a thorough portfolio of knowledge which is relevant for a successful start in experimental sport and exercise science. Nevertheless, it remains rather doubtful whether the book would really attract the attention of the targeted readership. It is much too text dominated. This weakens the impact of adequate wording and the provided examples of application and scientific transfer. Most of the figures and flow charts are of poor quality. It also remains questionable whether detailed descriptions of the personal computer, software, and the internet are really necessary nowadays. In general, the layout of the book appears somewhat deterrent compared with modern text books.

In conclusion, this book is well structured with mostly convincing content but a rather suboptimal layout. After thorough revision of the layout and minor aspects of content, it has the potential to improve from one of many more or less adequate handbooks to a very good tool which not only meets the requirements with respect to learning objectives but also to an adequate presentation to the targeted readership.

Analysis

Presentation	8/20
Comprehensiveness	15/20
Readability	11/20
Relevance	15/20
Evidence basis	18/20
Total	67/100

R Beneke, R M Leithäuser
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CALENDAR OF EVENTS

The Cutting Edge: Joint Conference of The British Association of Sport and Exercise Sciences and The British Association of Sport and Exercise Medicine in association with the National Sports Medicine Institute

3–7 September 2003, Sheffield
Further details: R.M. Bartlett. Email: r.m.bartlett@shu.ac.uk

Football Australasia Conference

23–25 September 2003, Melbourne, Australia
Further details: Football Australasia Conference, P.O. Box 235, North Balwyn, Victoria 3104, Australia

Congress for Science and Medicine in Cricket

25–26 September 2003, Loughborough, UK.
Further details: Julie Page, ECB. Tel: +44 (0)207 432 1261; email: julie.page@ecb.co.uk

17th Congress of the European Society for Surgery of the Shoulder and the Elbow (ESSSE)

24–27 September 2003 at the Convention Hall "Stadthalle" Heidelberg, Germany
Congress Chairman: Professor Dr med. habil. Peter Habermeyer; President of the Society: University-Professor Dr Herbert Resch. **Abstract deadline: 31 March 2003**
Further details: INTERCONGRESS GmbH. Tel: +49 611 97716-35; fax: +49 611 97716-16; email: katrin.volkland@intercongress.de; website: www.intercongress.de

The 5th British Musculoskeletal ultrasound course

1–3 October 2003, Leeds, UK
Musculoskeletal sonologists from the UK and mainland Europe will cover all aspects of musculoskeletal ultrasound in lectures and tutorials. The course is open to radiologists, radiographers, and clinicians with a US imaging interest.
Further details: Gill Bliss, MR Department, Clarendon Wing, Leeds General Infirmary, Great George Street, Leeds LS1 3EX. Tel: +44 (0)113 392 3768; fax: +44 (0)113 392 8241; email: gillian.bliss@leedsth.nhs.uk

Back Pain Prevention and Rehabilitation

5 October 2003, Glasgow, UK
A study day with Professor Stuart McGill. *Further details*: Yvonne Gilbert, BASEM Secretary, Royal College of Surgeons of Edinburgh, Nicolson Street, Edinburgh EH8 9DW. Tel: +44 (0)131 527 3409; email: y.gilbert@rcsed.ac.uk. Organised by BASEM Scotland.

Congress of Sports Medicine of the AZ Sint-Jan AV

24–25 October 2003, Bruges, Belgium
Further details: Congress Centre, OUD SINT-JIN, Mariastraat 38, B-8000, Brugge, Belgium; email: brucosport@azbrugge.be; website: www.brucosport.be

International Conference on the Science and Practice of Rugby

5–7 November 2003, Brisbane, Australia
Further details: Kerry Williams, Conference Organiser, QUT, GPO Box 2434, Brisbane, QLD 4001, Australia. Tel: +61 7 3864 2220; fax: +61 7 3864 5160; website: www.rugbystudies.com/conference

The Fifth International Conference on Sport, Leisure and Ergonomics

19–21 November 2003, Burton, Cheshire, UK
A three day conference in affiliation with the Ergonomics Society.
Further details: Congress Secretariat, Sport, Leisure and Ergonomics, Research Institute for Sport and Exercise Sciences, Liverpool John Moores University, Henry Cotton Campus, 15–21 Webster Street, Liverpool L3 2ET, UK. Tel: +44 (0)151 231 4088; email: K.George@livjm.ac.uk

Medicare India

6–8 April 2004, New Delhi, India
This exhibition and conference will be held for the first time, following India's ambitious "health for all" programme launched in 2002. Further details: Rob Grant, Kinex Log, 5 New Quebec Street, London W1H 7DD, UK. Tel: +44 (0)207 723 8020; fax: +44 (0)207 723 8060; email: rob.grant@kinexlog.com; websites: www.medicare-expo.com and www.kinexlog.com

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

NOTES AND NEWS

The Paul West Memorial Grant for Sport and Exercise Medicine Research in Scotland

BASEM and the family of Paul West are pleased to annouce the above grant which will be awarded annually. The award will be approximately £350. The research must be carried out in Scotland and concern the physically active population. Applications must be submitted to the Award Committee by **31 October 2003** for the inaugural award in January. *Further details*: Yvonne Gilbert, BASEM - Scotland Administrator, Royal College of Surgeons of Edinburgh, Nicolson Street, Edinburgh EH8 9DW, UK. Tel: +44 (0)131 527 3409; fax: +44 (0)131 527 3408; email: y.gilbert@rcsed.ac.uk

Intercollegiate Academic Board of Sport and Exercise Medicine

Professor Donald Macleod has completed his four year term as Chairman of the Intercollegiate Academic Board of Sport and Exercise Medicine. Professor Charles Galasko has been elected by the IABSEM Board to replace him. Professor Macleod has also been replaced as the representative of the Royal College of Surgeons of Edinburgh on IABSEM by Professor Angus Wallace.

Winners of the annual BASEM Prizes

Dr Eileen Mackie (Clopidogrel inhibits platelet activation and exercise induced ischaemia in stable coronary artery disease) and Mrs Eleanor Curry (Role of exercise in multiple sclerosis) (joint winners).
The poster prize was won by Dr Stuart Reid (Injury patterns and injury prevention strategies in the winter sports population attending the English medical centre in Val D'Isere.

Diploma in Sport and Exercise Medicine for Great Britain and Ireland

Details for the above exam can be found on the Royal College of Surgeons of Edinburgh Website at http://www.rcsed.ac.uk alternative applicants can write to: The Royal College of Surgeons of Edinburgh, Eligibilities Section, Careers Information Services, 3 Hill Place, Edinburgh, UK; tel: +44 (0)131 668 9222 *or* Mrs Yvonne Gilbert, Intercollegiate Academic Board for Sport and Exercise Medicine, Royal College of Surgeons of Edinburgh, Nicolson Street, Edinburgh EH8 9DW, UK; tel: +44 (0)131 527 3409; email: y.gilbert@rcsed.ac.uk

Intercollegiate Academic Board of Sport and Exercise Medicine Diploma Exam

The following were successful diplomates in the Intercollegiate Academic Board of Sport and Exercise Medicine Diploma Exam, the the two exams held in 2001 and 2002:

- Dr Andrew I Adair
- Dr Abimola Afolabi
- Dr Sinead M Armstrong
- Dr Terence J R Babwah
- Dr Catriona E L Boyle
- Dr Susan J Brick
- Dr Lawrence J Conway
- Dr Alan J Dawson
- Mr Patrick D Dissmann
- Dr Niall WA Elliott
- Dr Christopher J Ellis
- Dr Roger K Goulds
- Dr Niall A Hogan
- Dr James R Hopkinson
- Mr Ananta K Jayanti
- Dr Michelle Jeffrey
- Mr S P Kale
- Dr Arun Kumar
- Dr Robert M MacFarlane
- Dr Kaushal C Malhan
- Dr Martin D McConaghy
- Dr Lisa A McConnell
- Dr Fergal T E McCourt
- Dr Ronan M McKeown
- Dr Michael G McMullan
- Dr Steven R McNally
- Dr Paul J Moroney
- Dr Leonard D M Nokes
- Dr Nanda K G Pillai
- Dr Jonathan D Rees
- Dr Duncal A Reid
- Dr Cristyn C G Rhys-Dillon
- Dr Martin O Rochford
- Dr Hungerford A T Rowley
- Dr Shaun A Sexton
- Dr Jason E Smith
- Dr Aravinthan Suppiah
- Dr James A Thomas

For further information contact: Mrs Yvonne Gilbert, Administrative Secretary, Intercollegiate Academic Board of Sport and Exercise Medicine, Royal College of Surgeons of Edinburgh, Nicolson Street, Edinburgh EH8 9DW. Tel: +44 (0)131 527 3409; fax: +44 (0)131 527 3408; email: y.gilbert@rcsed.ac.uk

www.basem.co.uk

The British Association of Soprt and Exercise Medicine has launched its new website—www.basem.co.uk. The site provides information about the educational opportunities in sport and exercise medicine and advice to those wishing to become involved in this area.

Interested in Sports Medicine? Gain a higher degree from Australia's leading University

The Centre for Sports Medicine Research and Education is a multidisciplinary Centre located in the Faculty of Medicine, Dentistry and Health Sciences at the University of Melbourne, Australia. It combines world-class researchers and clinicians working in the area of sports medicine.

Research Higher Degrees

The Centre offers Doctor of Philosophy (PhD), Master of Sports Medicine, Master of Physiotherapy, Master of Science, and Doctor of Medicine degrees. These are available to graduates of health and medical science courses such as physical therapy, medicine and human movement.

Sports medicine at the University of New South Wales

Masters of Sports Medicine
You don't have to leave your practice:

- Delivery by distance education
- Videos, CD-ROMs, and online learning
- All aspects of Sports Medicine covered
- Locally organised examinations
- Clinical training
- Certificate and Diploma courses also offered

Further details: Sports Medicine Programs, UNSW Sydney 2052, Australia; tel: +612 9385 2557; fax: +612 9313 8629; email: sportsmed@unsw.edu.au

Web site: www.med.unsw.edu.au/sportsmed

NCPAD NEWS

A monthly publication of the National Center on Physical Activity and Disability. NCPAD is the leading source for information about organisations, programmes, and facilities nationwide providing accessible physical activity and recreation. NCPAD also has a large and growing online library of fact sheets, monographs, and contact information on physical activity and recreation for people with disabilities.
Sign up for this free monthly electronic newsletter by sending an email to: Listserv@listserv.uic.edu, with this message in the body of the e-mail: SUBSCRIBE NCPAD-NEWS yourfirstname yourlastname. If you have any difficulty, you can also sign up for the newsletter by going to http://www.ncpad.org/signup

Study Sports Physiotherapy in Australia's sporting capital at The University of Melbourne

Qualified physiotherapists may now apply for the Master of Physiotherapy by Coursework (Sports Physiotherapy), the Postgraduate Certificate in Physiotherapy (Sports Physiotherapy of the Spine, Pelvis and Lower Limb) or the Postgraduate Certificate in Physiotherapy (Sports Physiotherapy of the Spine, Shoulder and Upper Limb).

The School of Physiotherapy at the University of Melbourne now has approval for these courses and applications are open to international students for full time study.

- Master of Physiotherapy by Coursework (Sports Physiotherapy) NOW CLOSED.
- Postgraduate Certificate in Physiotherapy (Sports Physiotherapy of the Spine, Pelvis and Lower Limb) NOW CLOSED.
- Applications for the Postgraduate Certificate in Physiotherapy (Sports Physiotherapy of the Spine, Shoulder and Upper Limb) close **1 April 2003**.

Please check the website for updates and information about the courses: www.physioth.unimelb.edu.au/postgrad.html