Physical training is generally considered to increase serum high density lipoprotein cholesterol (HDL-C) levels. 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). HDL plays an important protective role in LDL oxidation. 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, 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 (Daichii Pure Chemicals, Tokyo, Japan) for triglycerides, Determiner HDL-C (Kyowa Medex) for HDL-C, and Cholestest LDL (Daichii 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. 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, 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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References

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...
Step 3: Calculate the RC score

This has led to the description itself and the related regression to the mean. (preseason) and after a concussion. cated the application of RC analyses to neuro-
test has changed from a previous assessment
vidual’s performance on a neuropsychological
changes that is, a change in performance after a concussion—that is, a
calculation hypothesis—an RC of less than

RC analyses were designed in accordance
with conventional models of neuropsycholog-
ical assessment—that is, to determine
whether the change observed in the indi-
vidual is true by comparing it with change
that occurs normally in some matched nor-
mative data set. The problem with currently
applied RC calculations is that the normal
amount of variation 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 in
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 (SEdiff). 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 (SDdiff) 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 can therefore assist the return to
play decision making process. Although we
play decision making in cases of sports
related concussion. A Collie

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Clinicians, neuropsychologists, and statisti-
cians working with RC techniques soon
realized 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 sub-
sequent assessment—and also by statistical
phenomena such as the reliability of the test
itself and the related regression to the mean.
This has led to the description and applica-
tion 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 incorpo-
ating corrections for practice effects, test
reliability, and regression to the mean.

The interpretation 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 than

1.65 indicates that true decline has
occurred. One advantage of RC statistics is
therefore that they can be applied immedi-
ately to individual level data, and therefore
interpreted on an individual basis. This makes
them applicable to clinical situations such as

\[ RC = \frac{x_2 - x_1}{SD_{diff}} \]

\[ A_{\text{diff}} = \frac{A_2 - A_1}{SD_{\text{diff}}} \]

\[ B_{\text{diff}} = \frac{B_2 - B_1}{SD_{\text{diff}}} \]

\[ N_{\text{diff}} = \frac{N - N_{\text{baseline}}}{SD_{\text{diff}}} \]

Step 1: Calculate the standard error of
measurement (SE).

\[ S_0 = \frac{1}{(N - 1)} \sum_{i=1}^{N} (x_i - \mu_{diff})^2 \]

Step 2: Calculate the standard error of change.

\[ SE_{\text{change}} = \frac{S_0}{\sqrt{N}} \]

Step 3: Calculate the RC score.

\[ RC = \frac{x_2 - x_1}{SE_{\text{change}}} \]

\[ x_1 \] is the participant’s baseline score,

\[ x_2 \] is the participant’s follow-up score,

\[ SE_{\text{change}} \] is the standard error of the change,

\[ S_0 \] is the baseline standard deviation of the measure,

\[ r_{12} \] is the test-retest reliability.

1.65 indicates that true decline has
occurred. One advantage of RC statistics is
therefore that they can be applied immedi-
ately to individual level data, and therefore
interpreted on an individual basis. This makes
them applicable to clinical situations such as

\[ SD_{\text{diff}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{diff})^2}{N - 1}} \]

\[ SD_{\text{change}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{diff})^2}{N}} \]

\[ SD_{\text{baseline}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{baseline})^2}{N}} \]

\[ SD_{\text{change}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{diff})^2}{N}} \]

\[ SD_{\text{baseline}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{baseline})^2}{N}} \]

\[ SD_{\text{change}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{diff})^2}{N}} \]

\[ SD_{\text{baseline}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{baseline})^2}{N}} \]

\[ SD_{\text{change}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{diff})^2}{N}} \]

\[ SD_{\text{baseline}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{baseline})^2}{N}} \]

\[ SD_{\text{change}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{diff})^2}{N}} \]

\[ SD_{\text{baseline}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{baseline})^2}{N}} \]

\[ SD_{\text{change}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{diff})^2}{N}} \]

\[ SD_{\text{baseline}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{baseline})^2}{N}} \]

\[ SD_{\text{change}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{diff})^2}{N}} \]

\[ SD_{\text{baseline}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{baseline})^2}{N}} \]

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\[ SD_{\text{baseline}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{baseline})^2}{N}} \]

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\[ SD_{\text{baseline}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{baseline})^2}{N}} \]

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\[ SD_{\text{change}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{diff})^2}{N}} \]

\[ SD_{\text{baseline}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{baseline})^2}{N}} \]

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\[ SD_{\text{change}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{diff})^2}{N}} \]

\[ SD_{\text{baseline}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{baseline})^2}{N}} \]

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\[ SD_{\text{baseline}} = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \mu_{baseline})^2}{N}} \]
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 most inferior 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 an almost completely regenerated upper portion of the trapezius muscle. The needle EMG was consistent with an almost completely regenerated upper portion of the trapezius muscle. The needle EMG was consistent with an almost completely regenerated upper portion of the trapezius muscle compared with an almost completely regenerated upper portion of the trapezius muscle. The needle EMG was consistent with an almost completely regenerated upper portion of the trapezius muscle compared with an almost completely regenerated upper portion of the trapezius muscle. The needle EMG was consistent with an almost completely regenerated upper portion of the trapezius muscle.
the 21st century. Dr Carpinelli’s paper 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 field of strength training and therapy have added credence and support to these words by employing multiple sets in their practice and research. In my opinion, most professionals who had used multiple sets are only legitimate interactions found between factors of validity for critiquing my study. When a factorial study, were inappropriately used according to reviewers. I would have had more than just Dr Carpinelli voicing criticism of my paper. The practitioners in the field would have contradicted my views many 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 who has recognized single sets in past years is Arthur Jones, the developer of the Nautilus machine. To my knowledge, he has never presented any 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 not be underestimated, 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…” is 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 an 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 comparisons were 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 optimizing 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 zealosity, which is commendable, were redirected to researching rather than criticizing old studies, his academic contributions would be more fruitful.

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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 taken until the ball has travelled outside the circle”. 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”. 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 the 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 increased 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 being 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 hit at the defender during a shot. Concern has been expressed at the number of facial injuries in hockey, 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

Complementary therapies for physical therapists


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

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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.

Science for exercise and sport


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 minimal 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 detergent compared with modern textbooks.

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.

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: t.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, Mariastaat 38, B-8000, Brugge, Belgium; email: brucosport@azbrugge.be; website: www.bruocosport.be

International Conference on the Science and Practice of Rugby

5–7 November 2003, Brisbane, Australia
Further details: Kerry Williams, Conference Organiser, QBG, P.O. 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 Cross Street, London W1H 7DS, UK. Tel: +44 (0)207 723 8020; fax: +44 (0)207 723 8060; email: rob.grant@kinexlog.com; website: www.medicare-expo.com and www.kinexlog.com
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 announce 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: ygilbert@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 (Clodpodgel 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 (Injury patterns and injury prevention strategies in the winter sports population).

The poster prize was won by Dr Stuart Reid (Injury patterns and injury prevention strategies in the winter sports population (Injury patterns and injury prevention strategies in the winter sports population).)

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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.

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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 Physio-
therapy (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 inter-
national 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 Certifi-
cate in Physiotherapy (Sports Physio-
therapy 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