

# PostScript

## LETTER

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## Electronic muscular stimulators: a novel unsuspected cause of rhabdomyolysis

We report the first case of rhabdomyolysis following the use of an electronic muscular stimulator for fitness. A 26 year old male student was referred to us in April 2002 suspected of having hepatitis because of severe asthenia and raised levels of transaminases. Over the preceding three months, laboratory tests showed persistent elevation of alanine transaminase and aspartate transaminase activities, reaching values of 125 U/l (normal range 10-60) and 58 U/l (normal range 10-40) respectively. Routine tests, including red blood cell count, haemoglobin concentration, white blood cell count, platelet count, alkaline phosphatase, bilirubin, creatinine, blood urea nitrogen, glucose, and serum protein electrophoresis, were all normal. All the causative agents of hepatitis (hepatitis A, B, C, E, and G viruses, cytomegalovirus, Epstein-Barr virus, HIV, auto-antibodies) were negative.  $\alpha_1$  Antitrypsin, caeruloplasmin, copper, iron, and liver ultrasound were also normal.

A further investigation revealed that the patient used an electronic stimulator (Ab Tronic Tm) to exercise the muscles. This is one of many fitness devices that use electronic stimulation to contract and release muscles.

A further laboratory test showed creatine kinase activity of 2917 mU/ml (normal range 22-269), creatine kinase-myoglobin 86 mU/ml (normal range 46-190), lactate dehydrogenase 602 mU/ml (normal range 266-500), aspartate transaminase 58 mU/ml (normal value 40), alanine transaminase 54 mU/ml (normal value 40), and  $\gamma$ -glutamyl transpeptidase 46 mU/ml (normal value 64). Electrocardiography and echocardiography results were normal.

These data ruled out hepatitis, and a diagnosis of rhabdomyolysis was made. Fortunately kidney function was not impaired, and only hydration therapy was performed. When the use of the stimulator was stopped, the enzymes gradually returned to normal levels and the patient had recovered fully within one month.

The literature contains several cases of exertional rhabdomyolysis, a potentially dangerous condition that cause the release of intracellular contents from skeletal muscles in concentrations that may lead to renal and other systemic complications.<sup>1-3</sup> The concern of the general public for body fitness has led to widespread frequenting of fitness centres and the use of widely advertised electronic devices, which can be readily purchased and used at home. Our patient was not a body-builder and did not take anabolic-androgenic steroids. He just used the electronic muscular stimulator at home. To our knowledge, this is the first report of rhabdomyolysis caused by an electronic stimulator. The purpose of this report is to assist clinicians in recognising this condition and to warn people against careless use of these devices.

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## References

- 1 **Braseth NR**, Allison EJ Jr, Gough JE. Exertional rhabdomyolysis in a body builder abusing anabolic androgenic steroids. *Eur J Emerg Med* 2001;8:155-7.
- 2 **Line RL**, Rust GS. Acute exertional rhabdomyolysis. [Review] *Am Fam Physician* 1995;52:502-6.
- 3 **Moghtader J**, Brady WJ Jr, Bonadio W. Exertional rhabdomyolysis in an adolescent athlete. [Review] *Pediatr Emerg Care* 1997;13:382-5.

## COMMENTARY

This case presentation provides evidence of the possible misuse of "home electrical stimulators" resulting in appreciable injury to the user. These devices are advertised as an easy route to a "six pack" set of abdominal muscles. The reality is that there is little evidence to support their use in exercise to achieve cosmetic or strength changes. Importantly, there may be people that are susceptible to the injury defined in this case, particularly with prolonged use (using the stimulator for several hours daily rather than in a short term traditional exercise session).

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## BOOK REVIEWS

### Drugs in sport: the pressure to perform

BMA. London: BMJ Publishing Group, 2002, £16.95, pp 165, softcover. ISBN 0727916068

This is a paperback book produced by the British Medical Association and is touted as "an invaluable aid." I would beg to differ,

and, in addition to several factual inaccuracies, the overall impression was that this had not been written by anyone who had been involved in the care of the elite athlete. Many can write a text by reviewing relevant material, but you can tell if the authors have an intimate working knowledge of the topic. When I looked at the names of the editors and contributing authors, I could not recognise any name as a doctor involved in elite sports medicine in the UK despite this being a British book. Furthermore, the topic of doping is ever evolving, and it will become increasingly inaccurate with the adoption of the World Anti-Doping code for the 2004 Olympic Games. Doping is an area where accuracy of information is imperative. A lot of the information looks almost like a "cut and paste" from the IOC website, which, for accuracy at the time of production, is fine but the authors lack the ability to translate this into meaningful practical issues. For example, in discussing caffeine it states "because caffeine is so widely consumed in beverages... , the IOC permits up to 12  $\mu$ g/ml in urine". So what might this mean in practical terms for the athlete? However, this is no longer pertinent because caffeine is now not restricted, its use only being monitored. With regard to information on local anaesthetics, it says "local anaesthetics are permitted in sport, when medically justified and subject to certain restrictions, principally relating to the route of administration." What exactly would this mean to the young sports doctor trying to decide whether to use an injection or not? Yet again the evolving doping world does not place restriction on the use of local anaesthetics now. The detail on the IOC's requirement for evidence of asthma is so sparse that the doctor would not know what evidence is required. The process of therapeutic use exemption (TUE) which is now required for notification of  $\beta_2$  agonists and glucocorticoids and other substances on the banned list required for therapeutic reasons had not started when the book was published, but is now one of the major logistical minefields that sports doctors face. It correctly states that pharmaceutical, chemical, and physical manipulation are prohibited methods of doping, but is unable to give the reader any examples of what this might mean, how athletes have tried to beat the tests in the past, and why the regulations on the sample collection procedure had to evolve as a result.

I became increasingly angry and frustrated as I continued to read this text. The issue on confidentiality of information seemed black and white to the authors. The dilemma for the team physician when one of the players admits in confidence to anabolic steroid abuse before a major game and, if tested positive, would result in the team being eliminated provides a scenario that requires a greater challenge to the management of the issue. This is particularly the case if the doctor is employed by the sport to care for the athlete, and the athlete is funded by the World Class Performance programme with money paid to them by their sport. The notion that the National Sports Medicine

Institute is a membership organisation is false (also sadly the organisation no longer exists!). The proposal to involve the Health Development Agency in education issues in doping is flawed, as they have no prior experience in this area. Carbohydrate loading using an intensive seven day training to deplete stores initially on a protein rich diet has not been recommended for some years. I could go on and on. Why oh why didn't they have knowledgeable authors with working experience in the topic? To anyone other than those with a passing interest in what was happening in anti-doping a few years ago, it is potentially dangerous and should not be purchased.

#### Rating

● Presentation	5/20
● Comprehensiveness	1/20
● Readability	5/20
● Relevance	7/20
● Evidence basis	7/20
● Total	25/100

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### Cross country skiing

Edited by H Rusko. London: Blackwell, 2003, £31.50, pp 198, softcover. ISBN 0632055715

Heikki Rusko has put together a comprehensive text with largely evidence based opinions on sports science and coaching and their relevance to Nordic skiing. In depth analysis and discussion on central issues is interesting, although at times becomes bogged down with too many laborious statistical graphs. Generally the development of key themes progresses logically and is easy to follow, but sometimes the text becomes unnecessarily complex and detracts from the issue. Summary boxes at the end of each section listing key points are particularly useful in pulling together complex topics, and good recommended reading lists give plenty of scope to explore topics further. If you are a clinician you may be disappointed in the lack of detail on musculoskeletal and medical issues, which have huge ramifications in this sport and make up many of the day to day duties for the sports physician.

I loved the section on the team physician which gives very practical advice for those sticky situations often encountered on tour and has obviously been written from a position of personal experience! Descriptions of skiing techniques is incredibly detailed and backed up with data gathered from elite athlete analysis over many years, providing a fantastic basis for the understanding of this sport.

Perhaps a little less generic discussion of basic science issues such as immunology and more clinically relevant themes could have been included. However, this book is certainly worth adding to your collection as an invaluable reference guide. Just make sure you don't use it as light reading!

Target audience: essentially sports scientists and coaches, with clinicians as a secondary audience.

#### Rating

● Presentation	13/20
● Comprehensiveness	15/20
● Readability	13/20
● Relevance	13/20
● Evidence basis	18/20
● Total	72/100

**P Blackman**

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### Drugs in sport: the pressure to perform

British Medical Association. London: BMJ Books, 2002, £15.95, pp 192, paperback. ISBN 0727916068

The book was launched in association with an excellent one day conference held in London in 2002 and attended by the reviewer. It was researched and published before the publication of the IOC study detailing widespread problems with unlisted banned substances in supplements and undoubtedly the authors will mention this in any future edition. Not all the authors' names will be familiar to British sports physicians, and some reference to their professional backgrounds would have been useful. That said, the assistance of the Anti-Doping Directorate at UK Sport is acknowledged in the preparation of the text.

It is an easy read and laid out in such a way that those without a medical qualification will be able to bypass some of the more complex pharmacology and access the main data. It is a good primer for all involved with the care of athletes, and I would suggest that even the experienced sports physician will find some new information therein. Each chapter is well referenced and would enable the reader to research further specific areas of interest. On page 11, the book makes reference to the "1970s survey of elite US college athletes". This is the questionnaire in which athletes provided their (theoretical) response to taking an undetectable drug that would guarantee a gold medal but would lead to their early death. I had always thought this to be a sports medicine urban myth—but to my surprise a reference is provided.

The introduction briefly reviews the history, legal regulation, and ethics of doping agents and also athletes' attitudes to the problem. The main categories of ergogenic drugs are then scrutinised, including their therapeutic categories, potential to enhance sporting performance, and their adverse effects in the short or long term. Further chapters deal with doping in elite sport and the use of anabolic androgenic steroids in British gymnasiums. A pedantic thought, should that plural actually be gymnasia? The three appendices at the back of the book detail the UK anti-doping programme,

laboratory analysis procedure, and contact details of UK national governing bodies.

One paragraph on page 85 is particularly topical: "Sports medicine - is there a lack of control?" This refers to a 1988 *Lancet* editorial recommending that sports medicine should be brought under the umbrella of a recognised body with accredited training. Progress over the intervening 15 years has hardly been rapid, but at least there's a joint government/profession working group currently taking this forward.

**C Jarvis**

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### The malalignment syndrome: implications for medicine and sport

Wolf Schamberger. London: Churchill Livingstone, 2002, £39.99, hardcover, pp 456. ISBN 0443064717

The concepts of malalignment and imbalance have gained popularity in sports medicine over the past 10 years, and have been used to explain many of the injuries with which athletes and physical activity participants present. Rather than simply treating local symptoms, sports medicine practitioners are now looking more globally for contributing factors to injuries and encouraging preventive measures that address these more global deficits. The malalignment syndrome is a comprehensive text that can assist sports medicine practitioners in understanding how malalignment contributes to a range of conditions, and how various sports and physical activities can impact on the alignment of anatomical structures. The book addresses not just the assessment and diagnosis of malalignment syndrome, but also several approaches to treatment, including manual therapy, orthotics, injection, surgery, and self help techniques.

As a clinician, academic, and researcher, I have found the level of detail in this book excellent. The authors and contributors have provided comprehensive material that is well supported by research evidence where available. Biomechanics, as it relates to malalignment, can be quite daunting for many practitioners. However, the author has managed to use clear explanations and weave biomechanical information into an understandable and applied context. The large number of figures used in the book complements the text and allows the reader to fully understand the concepts being discussed. Some photographs, however, require greater clarity in print.

Of interest is the way in which implications are drawn for several areas of medicine including neurology, gastroenterology, orthopaedics, cardiology, and gynaecology. A potential danger of covering several areas in a single chapter is that each medical specialty is given only superficial attention. In this text, however, comprehensive summaries are provided for each specialty area. Greater use of brief case studies would, however, be beneficial. The malalignment syndrome is also discussed with reference to a wide variety of sports and physical activities, including climbing, waterskiing, swimming,

weightlifting, and throwing sports (chapter 5). This specific information provides a comprehensive overview for those working with particular sports, although further references for each sport would allow the interested reader to pursue further knowledge. The equestrian sports were singled out for a chapter of their own (chapter 6), whereas this information may have been better placed with all the other sports.

This book is an excellent resource for either the sports medicine practitioner or academics preparing theoretical and clinical teaching on malalignment syndrome. Upper level students in the breadth of sports medicine and rehabilitation professions would also find this book a well written resource.

### Rating

• Presentation	17/20
• Comprehensiveness	18/20
• Readability	16/20
• Relevance	15/20
• Evidence basis	16/20
• Total	82/100

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## CALENDER OF EVENTS

### 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 coordinator, 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 Intersociety 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

### 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/>

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

15–16 October 2004, Brugge (Belgium)

*Further details:* tel: +32 (0)50 45 29 00; 45 22 30; fax: +32 (0)50 45 22 31

### 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

### BASEM Conference 2005

10–12 November 2005, Edinburgh, Scotland

*Further details:* Email: basemoffice@compuserve.com

### BASEM Conference 2006

5–7 October 2006, Oxford, UK

*Further details:* Email: basemoffice@compuserve.com