South African Sports Medicine Association
and
South African Rugby Medical Association
International Conference 2007

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Congress Academic Committee:

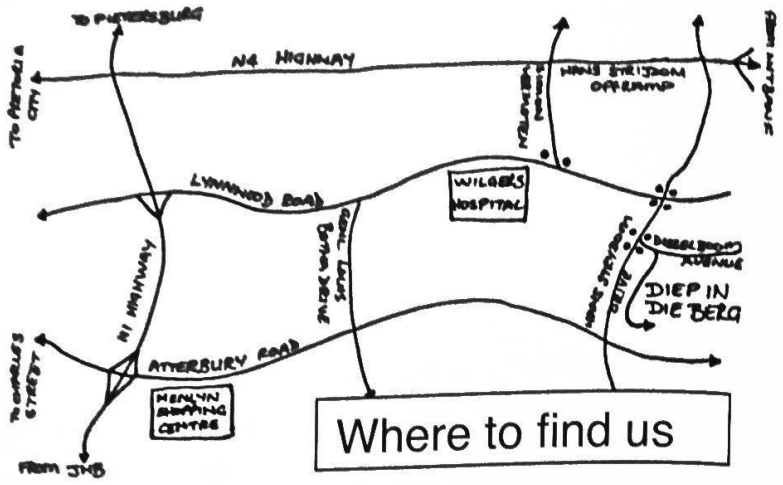
Chairperson: Dr Demitri Constantinou (Acting-President of SASMA, Director: Centre for Exercise Science and Sports Medicine, University of Witwatersrand)
Members: Dr Louis Holtzhausen (Head: Sports and Exercise Medicine Clinic, University of the Free State, President-elect: SASMA, Chairperson: South African Rugby Medical Association), Dr Christa Janse van Rensburg (Sports Medicine Division, University of Pretoria)
Assisted by: Prof Martin Schwellnus (Professor of Sports Medicine, University of Cape Town, Vice-President of FIMS), Prof Michael Lambert (MRC/UCT Exercise Science and Sports Medicine Research Unit)
Sports Imaging: Dr Zanet Oschman, Dr Richard de Villiers, Dr Mark Velleman

Congress Organizer: Gemini Events, Ms Lauren Mann, assisted by Dr D. Constantinou

CPD Accreditation: The 3 day academic programme has been accredited for 24 CPD points

29 Disselboom Street, Wapadrand, Pretoria 012-807 4630

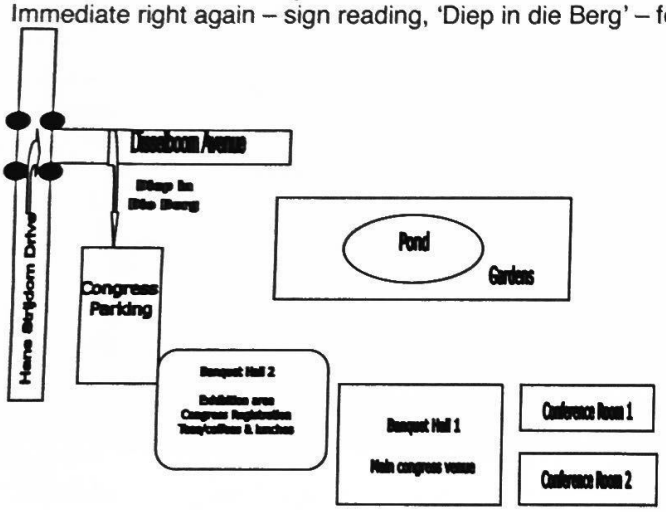
Traveling from Johannesburg



1. Continue on the N1 (North) through Midrand then follow the N1 Pietersburg highway traveling towards Pietersburg
2. Take the Lynnwood Road off ramp
3. At the traffic lights turn right into Lynnwood Road
4. Travel along Lynnwood until you get to Hans Strydom Road
5. At the traffic lights turn right into Hans Stydom Road
6. At the first set of traffic lights turn left into Disselboom street
7. Immediate right again – sign reading, 'Diep in die Berg' – follow path leading up the hill

Traveling from Pretoria

1. Continue with Schoeman street which becomes the Witbank highway (N4). Pass under the N1 Pietersburg – JHB highway
2. Take the Hans Strydom turn off (4th Off Ramp)
3. At the traffic circle turn right following the Garsfontein signs
4. Pass the Trade Centre on your left hand side
5. Cross Lynnwood road at the traffic lights
6. At the next set of traffic lights turn left into Disselboom street
7. Immediate right again – sign reading, 'Diep in die Berg' – follow path leading up the hill



South African Sports Medicine Association

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website: www.sasma.org.za
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Planning schedule:

Hour	Wednesday 14 November	Thursday 15 November	Friday 16 November	Comments
07h30	07h30-08h30 Registration			
08h00	Registration	08h00-08h45 keynote address	08h00-08h45 keynote address	
08h30	08h30 opening 08h45-09h30 keynote address	08h00-08h45 keynote address	08h00-08h45 keynote address	
09h30				
10h00	10h00-10h30 : tea	10h00-10h30 : tea	10h00-10h30 : tea	
11h00				
12h00	Lunch	Lunch SA Rugby Medical Conference registration	Lunch	
13h00				
14h00				
15h00				
15h30	15h30-16h00 : tea	15h30-16h00 : tea		
16h00		AGM: SA Rugby Medical Association	Closing of congress	
17h00	17h45-18h30 : BGM			
18h00	17h45-18h30 : BGM	18h30 – Congress Dinner and Awards		
19h00				

Notes:

Message from the Acting President of the South African Sports Medicine Association

November 2007

Dear delegates to the 12th Biennial SASMA Congress,

Welcome to Diep-in-die-Berg, in Pretoria, Gauteng. This once again promises to be an informative and memorable conference of the Association; catering for all the constituents of our multi-disciplinary fraternity.
We are addressing many aspects of sports medicine and science, including drugs in sport, performance measures, nutrition, psychology, injuries and sport-specific issues. The latter includes rugby, cricket and football; with many other sports covered in free communications from conducted research.
In a first, the South African Rugby Medical Association (SARMA), a new body, is incorporated in the SASMA Congress programme, and is presenting a certificate of attendance course for many of its Union Medical members. We welcome them and wish them all the very best in the future. We are proud to have facilitated and part-sponsored their course. Dr Louis Holtzhausen, the President-Elect of SASMA, is also the chairman of the SARMA, and has worked effortlessly at putting together this programme, as well as being on the academic committee for the Congress.
Another first for the Association, and the Congress, is the post-conference BLS (Basic Life Support) Course offered at an excellent rate. This is in run by Survival Technology, and covers the latest techniques of CPR and AED use. This has proved popular, and I am sure SASMA will continue with this relationship, and will offer other international certificate courses in the future, such as ACLS (Advanced Cardiac Life Support), PALS (Paediatric Advanced Life Support) and ITLS (International Trauma Life Support).
We are honoured to have Prof. Colin Fuller joining us from the Centre for Sports Medicine / University of Nottingham / Queen's Medical Centre, and sharing his expertise with us. We are very grateful to FIFA's Medical Office and F-MARC (FIFA Medical Assessment Centre) who have kindly sponsored Colin's travel to South Africa.
Prof Fuller is presenting one of the three keynote addresses, the second is by a former SASMA President who is well known to us, Prof Martin Schwellnus, and the third is by Dr Victor Ramathesele, the appointed General Medical Officer for 2010 FIFA World Cup South Africa™.
SASMA members still enjoy FIMS individual membership as part of the landmark deal that SASMA struck with FIMS in 2004, as part of their SASMA membership. In addition our members still enjoy preferential rates and upgrades when booking vehicles with Avis using the SASMA AWD (Avis Worldwide) number; and Frequent Guest deals with Southern Sun.
Thank you to the academic programme committee, to the presenters who have either submitted abstracts or been invited to present, to chairpersons of the sessions, to all the delegates for attending, to the exhibitors for contributing to the Congress and keeping us updated on their wares, to the hosts at Diep-in-Die Berg and The Farm Inn; and to Ms Lauren Mann who has worked tirelessly to make this a successful conference.
Finally I would like to wish Louis Holtzhausen all the very best and success as he takes on the reigns as President of SASMA 2007-2009.

Demitri Constantinou
Acting-President

Message from the Chairperson of the SA Rugby Medical Association

Rugby is one of the most popular sports played in South Africa. Through the successes of South African rugby teams over the years, the sport has become more than just that. It has created role models for our youth and is even playing a part in nation building in our country, as was evident again after the success of the Springboks in the recent Rugby World Cup.

One of the biggest challenges in rugby is the high incidence of injuries, especially of serious and catastrophic injuries at schoolboy level. A large percentage of rugby injuries is preventable by the application of simple principles such as correct coaching techniques, correct physical conditioning, good refereeing and continuous injury surveillance to search for possible causes. Catastrophy such as paraplegia and other complications of injury can be prevented by proper field side emergency care.

The South African Rugby Medical Association has been founded by the South African Rugby Union Medical Department to create a forum for scientists working in all levels of rugby in South Africa, to assist in the quest to make rugby a safer sport and to improve the quality of science and medical care in rugby. SA Rugby is in the process of developing a holistic player wellness and injury prevention programme. This is proving to be a major undertaking and will take lots of time, effort and money. There is no doubt that the SA Rugby Medical Association will play an important part in making a success of this endeavour. I invite all sports scientists and medical professionals to join this new association, to learn and make a contribution towards the safety of the sport

It is indeed a privilege for the SA Rugby Medical Association to have its inaugural conference in association with SASMA, an association with a great history of promoting and improving sports medicine and exercise science in South Africa. The theme of injury prevention is also very appropriate for this milestone event.

SASMA has succeeded once more in putting together an excellent conference programme, with exceptional speakers for the biennial international SASMA Conference. I am certainly looking forward and I trust that each delegate will be enriched by this experience.

Dr Louis Holtzhausen
Chairperson of the Steering Committee
SA Rugby Medical Association

SASMA Awards

Previous recipients of the Life and Honorary Member Award:

- Prof Tim Noakes
- Prof Martin Schwellnus
- Prof Wayne Derman
- Dr Etienne Hugo
- Dr Peter Schwartz
- Dr Joe Skowno
- Dr Dawid van Velden
- Dr Shorty Moolla
- Mrs Joyce Morton
- Dr Philda de Jager
- Prof Yoga Coopoo
- Dr Richard Stretch
- Prof Michael Lambert
- Dr Christa Janse van Rensburg
- Dr Michael Marshall

Certificates of appreciation to the Journal Reviewers 2006 – 2007

- Aginsky, Kerith
- Clark, Jimmy
- De Beer, Joe
- De Milander, Liesl
- De Villiers, Richard
- Dugas, Jonathan
- Durandt, Justin
- Gay, Jacque
- Gray, Andrew
- Hall, Sarah
- Havemann, Lize
- Johnston, Robyn
- Keet, Janet
- Kolbe-Alexander, Tracy
- Kohler, Ryan
- Lambert, Mike
- Lambert, Vicki
- Manjra, Shuaib
- McKune, Andrew
- Meurer, Bianca
- Micklesfield, Lisa
- Potgieter, Justus
- Potter, Paul
- Puckree, Lina
- Raine, Ricky
- Reid, Sorrel
- Saunders, Colleen
- Smith, Carine
- Smith, James
- Stretch, Richard
- Swart, Jeroen
- Viljoen, Wayne
- Wright, Zack

International Presenter

Dr Colin W. Fuller

SASMA President-Elect
Chairman SA Rugby Medical association

Dr Louis Holtzhausen

Curriculum Vitaes

Dr Colin W Fuller, BSc, PhD, FRSC

Associate Professor and Course Director (MSc in Sports and Exercise Medicine)

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Orthopaedic & Accident Surgery
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NG7 2UH

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Email: colin.fuller@nottingham.ac.uk

Dr. Colin Fuller graduated in Chemistry from Exeter University and obtained his PhD in Chemistry from Strathclyde University. He worked as a manager in the chemical and electricity generation industries for 25 years in various roles related to risk management. He subsequently lectured in risk management at Loughborough University and originated the MSc programme in health and safety management at the University of Leicester. Since 2005 he has been the Director of the Post-graduate programme in Sports and Exercise Medicine at the Centre for Sports Medicine, University of Nottingham.

Dr. Fuller has been a member of the Fédération Internationale de Football Association's Medical Assessment and Research Centre (F-MARC) in Zurich since 1998 and has collaborated with F-MARC on numerous research projects since then. Dr. Fuller has worked with the Rugby Football Union since 2001 and collaborated with Dr Simon Kemp (RFU) on the implementation of the Audit of Injuries amongst Premiership rugby players. Dr Fuller has provided consultancy advice to a number of other sports bodies, including UKSport (for example, guidance on risk assessment for Sports Governing Bodies), the Football Association (for example, comparison of injuries on artificial turf and natural grass surfaces) and the International Rugby Board (for example, consensus statement on auditing of rugby injuries, catastrophic spinal injuries, use of artificial turf playing surfaces and auditing of injuries during the RWC 2007).

Dr Fuller's main research interests are the management of risk in professional sport and the epidemiology of sports injuries.

Dr Fuller has published extensively in peer review journals and books.

ABBREVIATED CV: DR. LOUIS HOLTZHAUSEN

QUALIFICATIONS:

MB ChB (Free State)
M Phil (Sports Medicine) (UCT)
Fellowship of the SA Academy of Family Physicians
ACLS
PALS

CURRENT OCCUPATION:

Sports physician holding the following appointments:

- Director of Health: University of the Free State
- Head: Sports and Exercise Medicine Clinic, University of the Free State
- Program Director: Masters Programme in Sports Medicine, School of Medicine, University of the Free State
- President-elect: South African Sports Medicine Association (2007)
- Chairperson: South African Rugby Medical Association 2006 -
- Chairperson: Free State Rugby Union Medical Committee
- Regional Medical Co-ordinator: South African Sports Commission and Olympic Committee
- Sports Physician in private practice

PAST APPOINTMENTS IN SPORTS MEDICINE AND SPORTS SCIENCE

- Team doctor for rugby teams:
  - Cats Super 12 1998, 1999, 2001, 2005
  - South Africa "A" and Springbok training camp, 2003, 2004
  - Free State Cheetahs 1994 – 2004
  - SA Under 21 2001
  - Free State Super 10 1995
  - Free State Super 12 1997
  - SA Technikons 1995
  - SA Parliamentary Rugby team 1997 - 1999
- Conditioning and scientific co-ordinator: SASSU Soccer World Student Games squad, 2005.
- Projects co-ordinator: Centre for Exercise and Sports Science Services, UFS, 2002 - 2004
- Medical Consultant for Athletics Free State 1993-1999
- Member of the Natal Boxing Control Board and Medical Committee SA Boxing Control Board 1990 – 1992

MEMBERSHIP OF PROFESSIONAL ORGANISATIONS

- **Professional Councils**
  - Health Professions Council of South Africa – registered medical practitioner
  - General Medical Council (Great Britain) – registered medical practitioner
  - Republic of Ireland – Registered medical practitioner
- **Professional Associations**
- South African Sports Medicine Association – President elect 2007
- South African Rugby Medical Association – chairperson 2006-
- South African Academy of Family Physicians - Fellow
- American College of Sports Medicine – member
- International Sports Medicine Association (FIMS) - member
- South African Medical Association - member

Dr Holtzhausen has published in journals and presented at conferences

Keynote addresses: Banquet Hall 1

Wednesday 14 November
Prof. Colin Fuller *(Director of Post-Grad programme in Centre for Sports Medicine, University of Nottingham, Member of FIFA Medical Assessment and Research Centre)* – ***The role of risk management in Sports Medicine***

Thursday 15 November
Prof. Martin Schwellnus *(Professor of Sports Medicine, University of Cape Town, Vice-President of FIMS)* – ***Wisdom from the African Pot: Contributions to the growth and development of Sports Medicine***

Friday 16 November
Dr Victor Ramathesele *(General Medical Officer for 2010 FIFA World Cup South Africa™)* – ***South Africa's medical preparations for 2010 FIFA World Cup South Africa™***

Congress Social Programme and important events

SASMA Biennial General Meeting – Wednesday 14 November 2007, 17h45 – 18h30

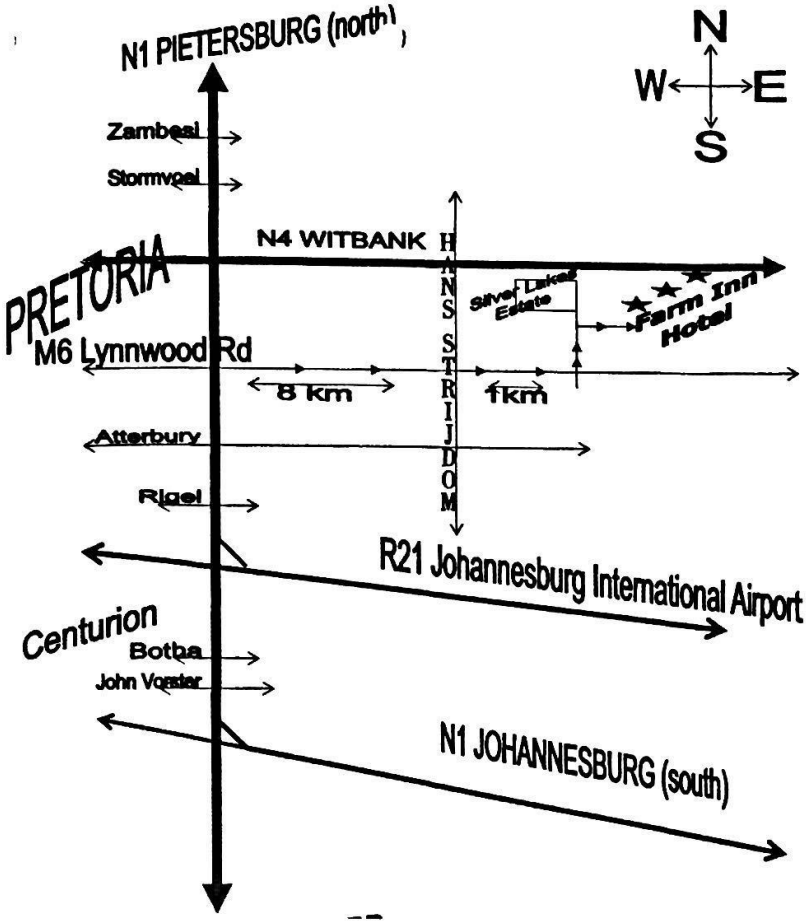
- Conference Room 2
- All SASMA members invited to attend
- President's report
- Official hand-over to President-Elect
- Amendments to constitution

Annual General Meeting: SA Rugby Medical Association – Thursday 14 November 2007, 16h00 – 17h30

- Conference Room 1
- All members of SA Rugby Medical Association invited to attend

Congress Dinner and Awards Evening – Thursday 15 November 2007, 18h00 for 18h30

- The Farm Inn (map below)
- Smart casual dress
- Dinner (complimentary drinks on table, thereafter cash bar available)
- Special guest speaker, Mr. Jonathan Stone.
- Handover to new SASMA President and address by Dr L Holtzhausen
- Please note there is a fee for this function and for catering purposes if you have not registered for this, inform Lauren at the registration desk or on 073 886 7970, if you will be attending.



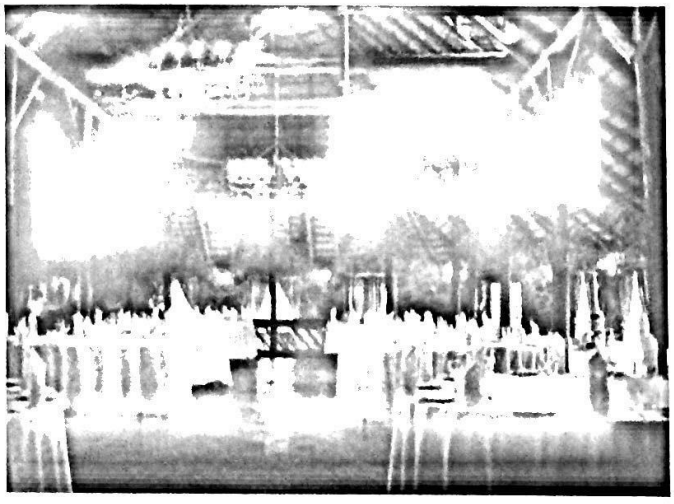
Directions to the Farm Inn Hotel

Directions to Get There : From Johannesburg
Follow the Pretoria signs on the N3, then take the N1 North (Pietersburg).
Take the Lynnwood/CSIR off-ramp & turn right at traffic lights.
Follow Lynwood (M6) through about 12 traffic lights (8km).
1.2km after crossing the intersection of Hans Strijdom & Lynnwood Road, turn left at the first traffic light.
The Farm Inn board will be on your right.

From Johannesburg International Airport
Follow the R21 North for roughly 40km, then take the N1 North (Pietersburg).
Take the Lynnwood/CSIR off-ramp & turn right at traffic lights.
Follow Lynwood (M6) through about 12 traffic lights (8km).
1.2km after crossing the intersection of Hans Strijdom & Lynnwood Road, turn left at the first traffic light.
The Farm Inn board will be on your right.

From Nelspruit & Witbank
Follow the N4 West Take the Hans Strijdom off-ramp.
Turn left at the top of the ramp.
At the traffic light turn left at the intersection of Hans Strijdom & Lynnwood Road, turn left at the first traffic light.
The Farm Inn board will be on your right.

From the North
Follow Zambesi Drive to the N1.
Turn right onto the N1 (south), follow the N1 to the Pretoria/Witbank (N4) off-ramp and take it East (left)
Take the 4th off-ramp (Hans Strijdom) and turn right at the top of the off-ramp.
At the traffic light turn left at the intersection of Hans Strijdom & Lynnwood Road, turn left at the first traffic light.
The Farm Inn board will be on your right



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List of Trade Exhibitors and Sponsors:

1. Allinad Healthcare – Trade Exhibitor

2. Avis Rent a Car

3. BSN Medical – Trade Exhibitor & Rugby Sponsor

4. DSM Nutritional Products – Trade Exhibitor

5. Fédération Internationale de Football Association (FIFA) – Sponsor for Dr Fuller

6. Fitness Professionals – Sponsor

7. Hi-Tech Therapy – Trade Exhibitor

8. IPRS – Trade Exhibitor

9. Life Healthcare Group – Dinner Sponsor

10. Lifemax – Sponsor

11. Liposun Africa / Vibrafit – Trade Exhibitor

12. MEDAC – Trade Exhibitor

13. MSD – Trade Exhibitor

14. Performance Pro – Sponsor

15. Power-Plate – Trade Exhibitor

16. Stryker – Trade Exhibitor and workshop sponsor

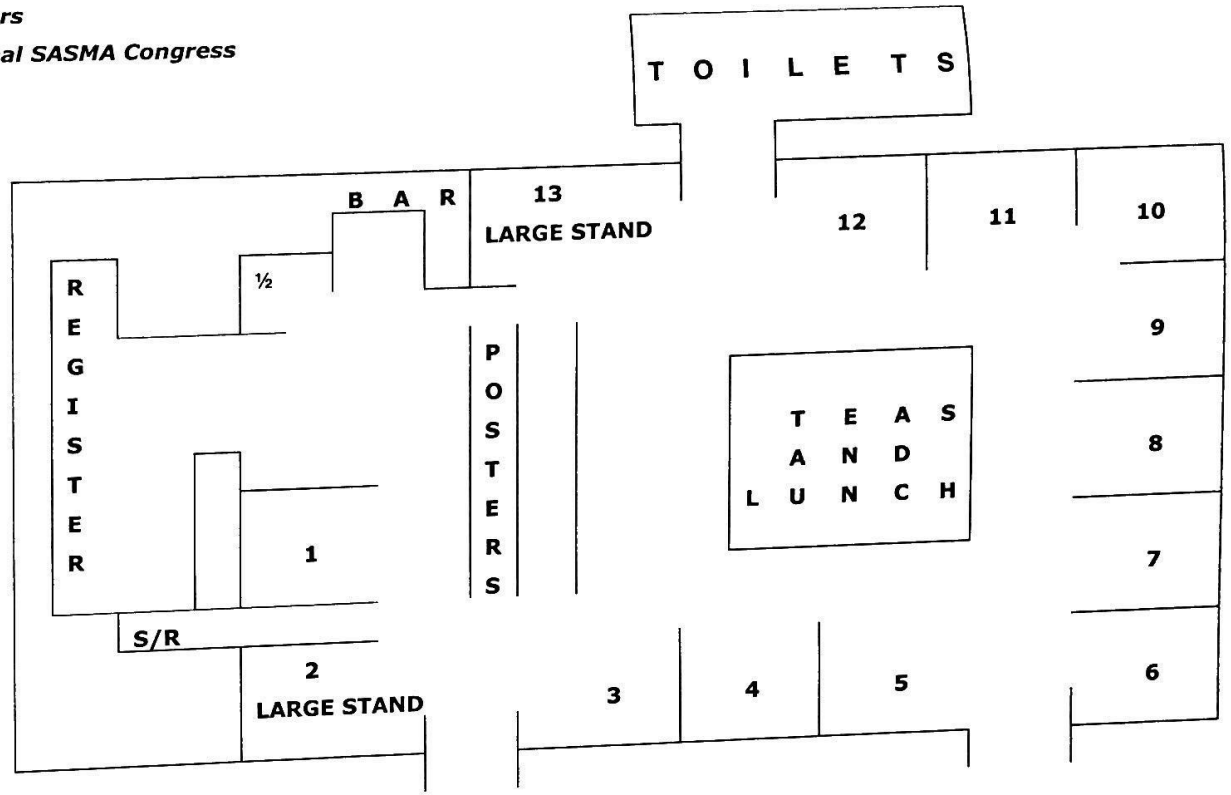
17. TDH Medical – Trade Exhibitor

18. Toshiba – Sports Imaging Equipment Sponsor

19. Wellness World Equipment – Trade Exhibitor

Venue layout for Exhibitors

12th Biennial International SASMA Congress



The trade exhibition hall will be open for the duration of the Congress, until lunch time on Friday 16 November. Lunches and teas will be held in the same area.

½. Injury Prevention and Rehabilitation Services
1. Hi-Tech Therapy
2. Wellness World Equipment
3 & 4 Liposun Africa / Vibrafit
5. TDH Medical
6. MSD
7. BSN Medical
8. DMS Nutritional Products SA
9 & 10. Power-Plate
11. Allinad Healthcare
12. Stryker
13. MEDAC

South African Sports Medicine Association
and
South African Rugby Medical Association
Conference

Time	Wednesday 14 November 2007		
07h30-08h30	**Venue: Banquet 2** Registration		
08H30-08H45	**Venue: Banquet 1** **Welcome and opening of the Congress**		
08H45-09H30	***Keynote Address***: Prof Colin Fuller (UK) : ***The role of risk management in sports medicine***		
09H30-10H00	**Venue: Banquet 1** **Chronic Diseases** *Chairperson/s: Prof Yoga Coopoo* **09h30-09h45** Van Heerden J. *Efficacy of resistance training on musculoskeletal fitness and morphology in type 2 diabetes* **09h45-10h00** Torres G. *Reproducibility of blood lactate transition threshold in persons with metabolic syndrome*	**Conference room 1** **Paediatric sports medicine** *Chairperson/s: Dr Mike Marshall* **09h30-10h00** Patel, D N *Metabolic syndrome and assessing cardiovascular risk in children and adolescents*	**Conference room 2** **Professional support for athletes** *Chairperson/s: Dr DA (Maaki) Ramagole* **09h30-10h00** De Jager, P
10H00-10H30	**Tea**		

10H30-12H00	**Chronic Diseases cont'd** **10h30-10h45** De Busser NL. *The associations between physical inactivity, other health risk factors and medical expenditure in a South African Healthcare Plan.* **10h45-11h00** Paul Y. *Efficacy of resistance training on aerobic function and perceived exertion in patients with Type 2 diabetes mellitus* **11h00-11h15** Kelly J E. *A pilot study comparing the effect of either aerobic or resistance training on blood lipid profile* **11h15-11h30** Ramagole DA. *A survey on the outcomes of bladder/urinary management in patients with spinal cord injury, who were rehabilitated at Muelmed Rehab from January to December 2006* **11h30-11h45** Heilbrunn A. *Does exercise improve Diabetes blood glucose control in Type 1 Diabetic sportsmen?"*	**Sports nutrition** *Chairperson/s: Dr A Bosch* **10h30-10h45** Volschenk PA. *EAT Smart for sport. A practical guide to sports nutrition* **10h45-11h00** Collins RM. *Differences in nutritional intake between overtrained and non-overtrained athletes with respect to protein, carbohydrate, recovery meal and supplements.* **11h00-11h30** Humphrey C. *Protein requirements in athletes - and how they can be met.*	**Return to play** Chairperson/s: Prof Michael Lambert **10h30-11h30** Lambert M. Recovery strategies after exercise **11h30-12h00** Theron N. *Clinical principles of return to play criteria for injured athletes*
12H00-13H00	**Lunch**		
13H00-14H00	**Sports Cardiology** *Chairperson/s Dr Demitri Constantinou* **13h00-13h30** Constantinou D. *Preparticipation evaluation with respect to cardiac risk* **13h30-14h00** Mpe M. *Sudden cardiac death syndrome*	**Supplements in the 21st century** *Chairperson/s: Ms Cara Humphrey* **13h00-13h15** Bosch AN. *Peptide and protein supplementation and exercise performance: current views* **13h15-13h30** Bosch AN. *Cycling time trial performance is not improved by either a mixed carbohydrate or carbohydrate/protein drink* **13h30-14h00** Marshall M. *The dangers of athletes taking supplements*	Symposium: **The needle in sports medicine** *Chairperson/s: Dr C Janse van Rensburg* **13h00-14h00** Janse van Rensburg C. *Hydrocortisone injections in sport*

14H00-15H30	**Cricket** *Chairperson/s: Prof Yoga Coopoo* **14h00-14h30** Stretch RA. *A review of cricket injuries and the effectiveness of strategies and measures to prevent cricket injuries at all levels* **14h30-14h45** Davies R. *The nature and incidence of fast bowling injuries at an elite, junior level and the associated risk factors* **14h45-15h30** Coopoo Y. *Principles of training in children*	**Sports psychology** *Chairperson/s: Ms V Germanos* **14h00-14h15** Claasen M. *Psychology has a lot to offer the injured athlete: the power of imagery* **14h15-14h30** Muller M. *How do physiotherapists and athletes talk about pain during the first consultation?* **14h30-14h45** Stirling A E .*The devolvement of drive for thinness among females in sport: a grounded theory study* **14h45-15h30** Muller M and Human L *Theoretical presentation and interactive discussion: Do South African athletes /teams "choke"?*	**The needle in sports medicine cont'd** **14h00-14h30** Constantinou D. *Vitamins, iron, botox and anti-inflammatory injections– their use in sport* **14h30-15h30** Stavrou S. *Dry needling and Trigger point injections. uses in sport injuries?*
15H30-16H00	**Tea**		
16H00-17H30	**Cricket cont'd** **16h00-16h15** Stretch RA. *An analysis of patient load data from the 2003 Cricket World Cup in South Africa* **16h15-16h30** Stretch RA. *An analysis of patient load data from the teams competing in the 2003 Cricket world Cup in South Africa* **16h30-17h30** **Workshop**: Christopher Ayerst. *Powerplate: Vibration therapy*	**The hip and groin** *Chairperson/s: Dr K.R. Subban* **16h00-16h20** Cakic JN. *Hip arthroscopy – subjective functional assessment* **16h20-16h40** Cakic JN. *Femoroacetabular impingement – the role of arthroscopy* **16h40-17h30** Ferguson M. *The role of surgery in chronic groin pain of athletes*	**Strapping workshop** *Facilitator*: Ms J McCord-Uys
17H45-18H30	**Conference room 2** **Biennial General Meeting**		

Time	Thursday 15 November 2007		
08h00-08h45	**VENUE: Banquet 1** ***Keynote Address***: Professor Martin Schwellnus : ***Wisdom from the African Pot: Contributions to the growth & development of Sports Medicine***		
08h45-10h00	**Venue: Banquet 1** **Clinical Case presentations** *Chairperson/s: Dr M Marshall*	**Conference room 1** **Injuries: lower limb** *Chairperson/s: Prof Wayne Derman* **08h45-09h00** Pryce JD. *Current trends in the treatment and prevention of lower extremity injuries: a focus on anterior cruciate ligament injuries* **09h00-09h15** Kotze H. *Lacerations sustained in rugby* **09h15-09h30** Mtshali PTS. *Common lower extremity injuries in female high school soccer players in Johannesburg East District* **09h30-09h45** Serfontein JH. *The influence of plyometric strength on the occurrence of lower leg injuries*	**Conference room 2** **Free Communications** *Chairperson/s: Dr Sello Motaung* **08h45-09h00** Van Heerden J. *Self reported incidence of injuries among Latin-American and ballroom dancers* **09h00-09h15** Lategan L. *Fitness levels of female ballet dancers* **09h15-09h30** Rose S. *Ad Libitum adjustment of fluid intake in cool environmental conditions maintain hydration status in a three-day mountain bike race* **09h30-09h45** Van Zyl FP. *Physiological adaptations in untrained African and Caucasian males, following eccentrically induced muscle damage*
10H00-10H30	Tea		

10H30-12H00	**Football Symposium** *Chairperson/s: Dr Demitri Constantinou* **10h30-11h00** Fuller C. *Comparison of the incidence, severity, nature and causes of football injuries sustained on new generation artificial turf and grass* **11h00-11h20** Motaung CS. *Stadium disaster management and the role of a match doctor* **11h20-11h40** Veenis R. *Medical Cover for players at selected United Kingdom Clubs* **11h40-12h00** Motaung CS. *Football education plan in South Africa*	**Free communications** *Chairperson/s: Dr Christa Janse van Rensburg* **10h30-10h45** Adams WG. *Wheelchair rugby as a means for developing competence among persons with quadriplegia* **10h45-11h00** Draper CE. *Spinal cord injuries in South African Rugby Union: New incidence data and implications for injury prevention* **11h00-11h15** Steyn L. *Management of cervical biomechanical dysfunction in schoolboy rugby players* **11h15-11h30** Alexander DG. *The impact of repeated mild traumatic brain injuries (concussions) on the cognitive and academic functioning of early adolescent rugby union players: a three year prospective, longitudinal study* **11h30-12h00** Fuller C. *Catastrophic injuries in rugby union: is the level of risk acceptable?*	**Exercise Physiology** *Chairperson/s: Prof Mike Lambert* **10h30-10h45** McKune AJ. *Alterations in salivary cortisol and α-Amylase characterize the stress response to downhill running* **10h45-11h00** Semple SJ. *Creatine Kinase (CK) responses in African vs. Caucasian males after a bout of exercise-induced muscle damage* **11h00-11h15** Myburgh KH. *Antioxidant (Oxiprovin]™ supplementation and muscle recovery from contusion injury – an in-vivo rat model study* **11h15-11h30** Smith LL. *Alterations in circulating cell adhesion molecules after repeated bouts of exercise induced muscle damage* **11h30-11h45** Ferreira MA. *A Biomechanical, anthropometrical and physical profile of the North West University Club netball players (withdrawn)*
12H00-13H00	**Lunch**	**Lunch** SA RUGBY MEDICAL CONFERENCE REGISTRATION	**Lunch**
13H00-14H00	*Chairperson/s: Prof Yoga Coopoo* **13h00-13h30** Stubbe P. *Practical vibration training - the "do's and dont's"* **13h30-14h00** Joseph LA. *Functional strengthening of the inner and outer unit - focus on the anatomical sling systems*	**Seminar** **Concussion** *Chairperson/s: Dr J Patricios* Kohler R: *Sports concussion – international consensus in contact and collision sports* Patricios J. *"our concussion mantra – the masters' voices to Mandela's melody" – a South African perspective* Shang G. *2-year analysis of cases presenting to the Sports Concussion Centre, Johannesburg.*	**Sports Podiatry** *Chairperson/s: Ms. Nomzamo Duma* **13h00-13h20** Els M. *The influence of medial cleat wedging on the knee kinematics during stationary cycling* **13h20-13h40** Lever V. *Cycling biomechanics and associated lower limb problems.* **13h40-14h00** Zipfel B. *A Literature Review of Anthropological Studies determining the origins of running*

14H00-15H30	**Seminar** **Doping** *Chairperson/s: Dr Demitri Constantinou* **14h00-14h15** Human LH. *Constructing innocence of doping by a professional cricket player* **14h15-14h45** Hawksworth W. *The chemistry of doping* **14h45-15h30** Hawksworth W. *Traditional African plants and the World Anti-Doping Agency*	**14h00-15h30: Concussion cont'd** **Workshop** Patricios J, Kohler R, Shang G *Establishing a Sports Concussion Centre*	**Soft Tissue Injuries** Chairperson/s: Dr Austin Jeans **14h00-14h30** Schwellnus MP. *How to treat hamstring injuries in the first 24 hours* **14h30-15h00** Derman EW. *Medical Consequences of Chronic Exposure to Endurance Running* **15h00-15h30** Derman EW. *Are stem cells and growth factors the magic bullet for chronic soft tissue injuries?*
15H30-16H00	**Tea**		
16H00-17H30		**Conference 1:** **Annual General Meeting: SA Rugby Medical Association** *Chairperson/s: Dr L Holtzhausen, Dr I Jakoet*	
18H30	**Okavango Room, The Farm Inn** ***Congress Dinner and awards***		

Time	Friday 16 November 2007		
	Venue: Banquet 1		
08H00-08H45	***Keynote Address***: Ramathesele V. ***South Africa's medical preparations for 2010 FIFA World Cup South Africa™***		
08H45-10H00	**Venue: Banquet 1** **Tendinopathies** *Chairperson/s: Dr Nicolas Theron* **08h45-09h30** Ramagole, DA. *Update on tendinopathies* **09h30-10h00** De Jager. *Role of ultrasound in the sports physician's practice*	**Conference room 1** **RUGBY MEDICAL COURSE** *Chairperson/s: Dr L Holtzhausen* Provincial team medical staff. *Feedback from provincial unions,* *Case presentations* *Free communications*	**Conference room 2** **Clinical Workshop** Sports Imaging : **The South African Musculoskeletal Imaging Group** *Chairperson/s: Dr Z Oschman* MRI
10H00-10H30	**Tea**		
10H30-12H00	**Free communications** *Chairperson/s: Dr Jon Patricios* **10h30-10h45** Roberts C. *Does regular use of a magnetic breathing device improve athletic performance/ A randomized, placebo controlled clinical trial* **10h45-11h00** Cilliers JF. *Effects of resistance training on joint mobility in elderly South Africans* **11h00-11h30** Trade exhibition and posters **11h30-12h00** Lambert M. *Publishing in the Health Sciences – the role of the reviewer*	**RUGBY MEDICAL COURSE** *Chairperson/s: Dr L Holtzhausen* Research in rugby Lambert M. *The importance of data collection in rugby* David van Wyk *Research project: Recovery techniques* Dr Adele Lubbe. *Research project: Injury surveillance*	**Clinical Workshop** Sports Imaging **The South African Musculoskeletal Imaging Group** *Chairperson/s: Dr Z Oschman* MRI
12H00-13H00	**Lunch**		
13H00-14H00	**Stryker Workshop:** **Compartment syndrome** *Chairperson/s:* Constantinou D. *The pathophysiology of compartment syndrome* Patricios J, Constantinou D. *Practical*	**RUGBY MEDICAL COURSE** *Chairperson/s: Dr L Holtzhausen* **13h00-13h30** Craig Roberts. *Emergency field side care and ethics* **13h30-14h00** Jimmy Wright. *Conditioning in rugby*	**Clinical Workshop** Sports Imaging **The South African Musculoskeletal Imaging Group** *Chairperson/s: Dr Z Oschman* Case presentations and discussions

14H00-15H30	**Shoulder** *Chairperson/s: Dr Austin Jeans* **14h00-14h15** Rossouw B. *Shoulder pain, strength and range of movement in elite female underwater hockey players* **14h15-14h30** Rossouw B. *Shoulder range of movement in elite female underwater hockey players* **14h30-14h45** Rossouw B. *Isokinetic shoulder rotation strength in elite female underwater hockey players* **14h45-15h00** Espag M. *Results of modified Laterjet reconstruction in patients with anteroiferior instability and significant bone loss* **15h00-15h15** Espag M. *Overuse insertional tendinopathy of pectoralis minor muscles in athletes* **15h15-15h30** Espag M. *Humeral avulsion of glenohumeral ligaments: an under-recognized pathological lesion in recurrent glenohumeral instability*	**RUGBY MEDICAL COURSE** *Chairperson/s: Dr L Holtzhausen* **14h15-15h00** Dr Pierre Viviers & Stephan du Toit. *The multi-professional scientific team – the SA under 19 experience* **15h00-15h45** Shelley Meltzer. *Nutrition/supplementation: fact and fiction* **15h45** Closure of Rugby Conference stream	**Clinical Workshop** Sports Imaging **The South African Musculoskeletal Imaging Group** *Chairperson/s: Dr Z Oschman* De Villiers P. **Ultrasound (equipment supplied by Toshiba)**
16H00	**Closing of the meeting**		

☐ Poster Presentations in the Trade Exhibition area

South African Sports Medicine Association 12th Biennial International Congress and South African Rugby Medical Association 14 - 16 November 2007

WHEELCHAIR RUGBY AS A MEANS FOR DEVELOPING PHYSICAL COMPETENCE AMONG PERSONS WITH QUADRIPLEGIA

Adams, W.G. and Bressan, E.S.

Stellenbosch University

Participation in sport for persons with physical disabilities has been associated with various improvements in physical performance competence, including physical fitness and motor skills. The aim of this study was to explore the potential of the competitive sport of wheelchair rugby, to offer opportunities to persons with quadriplegia to improve two variables of physical competence: their wheelchair mobility and their eye-hand coordination. These physical capacities were chosen because they underlie activities of daily living as well as sport performance. The method used was descriptive performance analysis. Computer-based digital video games analysis was completed on six wheelchair rugby games at the club level, six at national level and six at international level, in order to compare the relative proficiency of players in terms of mobility and coordination. The results revealed that club level competition is dominated by the lowest levels of mobility and coordination, while the highest levels are at the international level. While these results were not surprising, they do document that there is considerable scope for persons with quadriplegia to improve their physical performance capacities though participation in sport. It can be concluded that for some persons with disability, sport may be a viable activity in the rehabilitation process. These results also support the recognition of disability sport as a valid competitive sporting activity, since it has clearly matured to the place where there are significant differences between skilful performances at the different levels of competition.

THE IMPACT OF REPEATED MILD TRAUMATIC BRAIN INJURIES (CONCUSSIONS) ON THE COGNITIVE AND ACADEMIC FUNCTIONING OF EARLY ADOLESCENT RUGBY UNION PLAYERS: A THREE-YEAR PROSPECTIVE, LONGITUDINAL STUDY

Alexander D.G.[1], Malcolm C.[2], Kidd M.[1]

[1]University of Stellenbosch, [2]University of the Western Cape

This study investigated, within the context of brain reserve capacity (BRC) theory, whether repeated concussions resulted in residual deficits in cognitive and academic functioning of early adolescent rugby players relative to non-contact sports controls. Participants were 150 grade 7 preparatory schoolboys tested before and after three winter sport seasons using neuropsychological and academic test scores. Cross tabulation analysis revealed that 68% of the rugby group reported concussions compared with 36% of the non/previous rugby groups. WISC III vocabulary subtest (VOC) scores (measure of BRC) were significantly higher for controls versus rugby players ($p<0.01$) at baseline. Correlational analysis revealed a strong positive relationship between VOC and academic aggregate (AGG) ($r=0.52$) and similarities (SIM) ($r=0.55$) - a measure of abstract thinking. Group mean comparisons, using repeated measures ANOVA, across the battery of tests for the rugby and concussion group participants' responses, showed some significant time effects ($p<0.01$) but no significant combined or group effects. There was a trend SIM ($p=0.07$) (rugby 3) for current players to score lower than non/previous players, albeit not significant. Analysis of the percentages of deficits for SIM (non-compromised participants) revealed that at baseline 12.5 % of the non-rugby group performed below the appropriate norm in contrast to 17.4% of the rugby group. Three years later the outcome was 8.3% and 28.2% respectively. When VOC was factored into the analysis there was a significant difference between the scores of the control group with no concussions and the rugby group with many concussions over time for AGG ($p=0.02$) (combined). These findings suggest: 1. early adolescent rugby players experience more concussions than controls. 2. Rugby players may be more vulnerable in terms of BRC. 3. There is a trend towards more deficits over time for rugby players on measures of abstract thinking and significantly lower academic mean scores for players with multiple concussions.

A STUDY TO INVESTIGATE THE EFFECT OF AN INTENSIVE TRAINING PROGRAMME ON HEART RATE VARIABILITY

***PF Aucamp, *CC Grant, *DC Janse van Rensburg, **JH Owen**

**Section Sports Medicine, **Dept of Statistics, University of Pretoria*

Background. Heart rate variability (HRV) refers to the beat-to-beat variation in heart rate, largely due to fluctuating influences of the sympathetic and parasympathetic branches of the autonomic nervous system. Cohort studies have demonstrated differences in HRV between athletes and sedentary subjects but longitudinal studies have shown conflicting results concerning modification of HRV after a training programme. Most studies in the field of HRV were done on both small sample groups and high performance athletes, which makes a comparison with the general population difficult.

Aim. The aim of this study was to measure the effect of an intensive three-month training programme on HRV as determined by Time Domain Analysis and the Poincare Analysis.

Method. A group consisting of 100 SANDF recruits, males and females in equal numbers, between the ages of 18 and 25, participated in this longitudinal study. Data were collected from the participants lying in a supine position in a low-noise area, at a room temperature of 22°C. The HRV was determined by analysis of R-R interval data sets, which were obtained by POLAR heart rate monitors. R-R intervals were sampled over a period of 20 minutes; the first 10 min in supine position and the next in an upright position. Five-minute tachograms were used for analysis. Data were downloaded to a computer and analyzed using POLAR software. The same procedure was followed after the participants completed the SANDF basic training programme of 12 weeks. HRV was determined with Time Domain Analysis and the Poincare Analysis of the five-minute tachograms.

Statistical analysis. The pre-training results were compared with the post-training results with a t-test for two dependent samples (paired observations). The data were analysed using SAS® version 8.2.

Results. Compared with the heart rate data before training commenced, there was a statistically significant increase in HRV and a statistically significant decrease in mean heart rate after completion of the training programme. This study group reflects well on the general population in the 18 - 25-year age group, and the results could be extrapolated to the general population.

CYCLING TIME TRIAL PERFORMANCE IS NOT IMPROVED BY EITHER A MIXED CARBOHYDRATE OR CARBOHYDRATE/ PROTEIN DRINK

Bosch, A. N. and White, S.

UCT/ MRC Research Unit for Exercise Science and Sports Medicine, Sports Science Institute of South Africa, University of Cape Town, South Africa

Recently, higher than conventional oxidation rates have been measured when a mixed carbohydrate (CHO) drink has been ingested during prolonged exercise, and it has been suggested that this as well as the ingestion of protein during prolonged exercise may improve performance. In this study, trained cyclists (n=5) performed three 100 km time trials in the laboratory during which they consumed in random order either a 10% mixed CHO drink (MIX) providing 0.5 g/min glucose + 0.25 g/min of fructose + 0.25 g/min of sucrose, a CHO/protein drink providing 0.8 g/min CHO (glucose polymer) + 0.2 g/min of protein (CHO+Pro), or a 10% glucose polymer (GP) drink (1.0 g/min). Each beverage was ingested at 150 ml every 15 min (600 ml/hour). Time to complete the 100 km was recorded. Stable isotope techniques were utilized to determine rates of oxidation of the ingested CHO every 15 minutes. Despite significantly ($p<0.05$) higher peak exogenous oxidation rates for MIX and CHO+Pro (2.23 and 2.50 g/min, respectively) than GP (1.13 g/min), there were no significant differences in time taken to complete the 100 km time trial (150.1 ± 9.8 min for MIX, 153.1 ± 13.0 min for CHO+Pro and 150.1 ± 14.2 min for GP, respectively). Total CHO oxidation was highest with MIX, being significantly ($p<0.05$) higher than CHO+Pro, despite similar exogenous oxidation rates. CHO oxidation was also lower in CHO+Pro compared with GP ($p=0.0412$). RER decreased with increasing trial duration, reflected by a significant decrease in CHO utilisation from 30 minutes to 120 minutes ($p=0.0141$). There was no difference in RPE between trials, although RPE increased significantly over time. In conclusion, despite high rates of oxidation, none of the drinks offered any performance advantage, but the GP and MIX drinks were more acceptable to the participants than the protein-containing drink.

HIP ARTHROSCOPY - SUBJECTIVE FUNCTIONAL ASSESSMENT

Cakic J N

Rosebank Centre for Sports Medicine and Orthopaedics, Carstenhof Clinic

Many hip disorders that are now manageable using an arthroscopical technique, previously went undetected and therefore untreated. Arthroscopy is now an option for many patients who would have been forced to live with their symptoms and modify their lifestyles accordingly. Hip arthroscopy became an essential tool in the treatment of many hip disorders. However, evaluation of each patient is the most important factor. The condition of each patient has to be assessed individually, in order to ascertain whether the source of pain and symptoms are intra- articular and thus potentially manageable by arthroscopical surgery.

Indications for hip arthroscopy are numerous: loose bodies, labral tears, degenerative conditions, chondral injuries, femoroacetabular impingement, osteochondritis dissecans, synovial diseases, rheumatoid arthritis and similar conditions, ligamentum teres ruptures, impinging osteophytes, medial joint OA, adhesive capsulitis, joint sepsis and unresolved hip pain. Arthroscopy is also described as a method of treatment of some extra-articular conditions such as: iliopsoas release, iliopsoas bursectomy, trochanteric bursitis treatment and priformis release.

Correct patient selection is the key to a successful outcome. Selection criteria include pathology, clinical circumstance as well as proper patient preoperative education, and informative consultation in order that the patient will have reasonable expectations of the postoperative outcome.

The purpose of this study is to present the results of arthroscopical hip surgery performed by a single surgeon between 2001 and 2006.

During this period, arthroscopical surgery of the hip was performed on 145 patients.

In order to perform the functional analysis of the procedure, the UCLA functional scale was used. On the functional score from 1 to 10, preoperative score on average was 3, at 6 weeks patients assessed themselves osn average at level 7. Three-month assessment as well as 6-month follow-up were at the level 8.

Hip arthroscopy is a successful surgical tool for treatment of many previously undiagnosed conditions, with a high percentage of subjective feel of improvement in symptoms compared with the preoperative status.

FEMOROACETABULAR IMPINGEMENT - THE ROLE OF ARTHROSCOPY

Cakic J N

Rosebank Centre for Sports Medicine and Orthopaedics, Carstenhof Clinic, Midrand

Hip pain in young, active adults without evidence of arthrosis can present a diagnostic dilemma. Causes can be varied. Secondary osteoarthritis of the hip occurs due to known precipitating factors. However, in the case of primary, idiopathic conditions the cause remains unknown. Recent studies have suggested that femoroacetabular impingement (FAI) may be responsible for the progression of degenerative changes in this group of patients.

FAI is a distinct pathological entity, defined as the abutment between the proximal femur and acetabular rim. Ganz has described two distinct types of FAI: Cam and Pincer. Cam impingement occurs when an abnormally shaped femoral head contacts a normal acetabulum, particularly in flexion and internal rotation. Pincer-type of impingement involves a normal femoral neck contacting an abnormal, deep or retroverted acetabulum. This condition results in a unique pattern of labral and chondral injuries resulting in early osteoarthritis presentation. According to Philippon, in the athlete, FAI is a major cause of hip pain. In fact, 36% of high-level athletes who underwent hip arthroscopy between 2000 and 2005 required decompression of FAI.

Arthroscopic treatment of hip impingement specifically secondary to an abnormal head-neck offset can significantly improve symptoms present at the time. It may also, by restoring hip morphology, stop or rather slow down the process of progression towards a degenerative hip condition.

The aim of this presentation is to present local experience in the treatment of femoroacetabular impingement.

Arthroscopic hip surgery in this practice started with the first operation in November 2001. Since that time over 150 hip arthroscopic procedures have been performed.

Femoroacetabular impingement was addressed only after a long and steep learning curve and training in the USA. The first patient was operated on in October 2004. Since then, from 109 patients undergoing arthroscopic surgery for hip-related pathologies, 10 patients have had FAI decompression.

In analysis of the subjective success of the procedure the UCLA Activity Score was used. Questionnaires were given to patients for completion preoperatively, as well as at 6 weeks, 3 and 6 months and 1-year follow-up.

PSYCHOLOGY HAS A LOT TO OFFER THE INJURED ATHLETE: THE POWER OF IMAGERY

Claasen Maretha, MA Psychology (UP)

Psychologist in Private Practice

'Injury can exert a direct influence on an athlete's psychological well-being, which in turn can affect the athlete's health and future athletic performance, as well as increasing the risk of further injury.'

Imagery, in combination with other psychological skills, is considered to be a very effective psychological intervention to aid the psychological well-being of the injured athlete, to manage pain, to deal with the rehabilitation process and even to speed up recovery time.

The goal of this paper is to bring the importance and great value of psychological intervention, and imagery per sé, to optimise the rehabilitation process, to the attention of all parties involved with injured athletes.

ENERGY SYSTEM CONTRIBUTION TO 2 000-m ROWING ERGOMETRY

Clark JR

Institute for Sport Research, Department of Biokinetics, Sport and Leisure Sciences, University of Pretoria

Exercise scientists and coaches frequently base physical conditioning objectives on the physiological profile of the sport in question. This profile includes the relative contribution of the energy supply mechanisms during the task, which is dependent on the nature of the task and characteristics of the athlete. The reported contributions for oxidative and non-oxidative metabolism to 2 000-m rowing ergometry in the literature show large variation, with a variety of methods being employed. The purpose of this study is to quantify the relative energy system contributions to an all-out effort 2 000-m row on an ergometer. Twenty well-trained male rowers will be asked to volunteer as subjects for the study. The accumulated oxygen deficit (AOD) method will be used in conjunction with exercise gas analysis to calculate the relative oxidative and non-oxidative metabolic contributions. Descriptive (mean ± SD; range) statistics will be used to characterize the energy system contributions and physiological responses to the 2 000-m trial. Pearson product correlation coefficients will be used to establish the strength of the relationship between energy system contributions and performance time in the 2 000-m time trial. The results will be discussed. It is expected that results will show a ~85% oxidative and ~15% non-oxidative contribution to all-out effort 2 000-m rowing ergometry.

DIFFERENCES IN NUTRITIONAL INTAKE BETWEEN OVERTRAINED AND NON-OVERTRAINED ATHLETES WITH RESPECT TO PROTEIN, CARBOHYDRATE, RECOVERY MEAL AND SUPPLEMENTS

Collins,RM; Janse van Rensburg,DC; De Villiers,N; Owen,JH; Grant,CC

Section Sports Medicine, University of Pretoria

Background. Overtraining syndrome (OTS) is an extremely common symptom complex affecting athletes of all levels. Characterised by symptoms that mimic depression, it is associated with a decrease in athletic performance. There are currently no clear guidelines for diagnosis or prevention of this debilitating condition.

Aim. This study aims to elucidate any differences in nutritional intake between athletes suffering from and those not suffering from OTS.

Method. Thirty-three volunteers aged 12 - 48, from Pretoria-based athletics clubs, participated in this study. They were divided into two groups: the OTS group, and the non-OTS (NOTS) group, based on the presence or absence of symptoms of OTS. All were asked to complete a questionnaire (based on the Sports Information and Science Agency General Nutritional Information Questionnaire) detailing their nutritional intake over an average training day and the average amount of time spent training weekly. The results were entered into a computer program ('Food Finder'), which showed the exact breakdown of all macro- and micronutrients per athlete.

Results. Will be discussed.

Conclusion. We concluded that there is a significant difference in energy balance between these two groups of athletes with respect to total energy and carbohydrate intake. The nutritional intake of the OTS group was insufficient to meet their energy demands, which probably contributed to their symptoms of OTS. The relatively lesser use of a recovery meal, and the relatively increased use of fat and protein warrant further study in larger trials.

THE NATURE AND INCIDENCE OF FAST BOWLING INJURIES AT AN ELITE JUNIOR LEVEL AND THE ASSOCIATED RISK FACTORS

Davies, R[1], Stretch, RA[2] Du Randt, R[2], Venter, DJL[2]

[1]*Biokinetics Masters student, Nelson Mandela Metropolitan University, Port Elizabeth, South Africa*

[2]*Nelson Mandela Metropolitan University, Port Elizabeth, South Africa*

The aim of this study was to compile an injury profile for fast bowlers, aged 11 - 18, and to identify the associated risk factors for injury during a normal academy cricket season. Forty-six fast bowlers were selected and observed throughout the academy cricket season (March - November). Three injury classifications were used (uninjured = S1; injured but able to play = S2; injured and unable to play = S3). Variables tested anthropometric and postural data, physical fitness, bowling workload and bowling techniques. Statistical significance is indicated by p-values less than 0.05 ($p<0.05$) and practical significance is indicated by Cohen's d-values of 0.2 or better ($d>0.2$). Only 15% of the participants remained injury free during the course of the season, while approximately one out of every three players (35%) were at some stage injured to such an extent that they were unable to play. The incidence of serious injury increased from 4% at T1 to 30% at T3 ($\chi^2=14.73$, d.f. = 4, $p=0.005$, Cramér's $V=0.23$). Hyperextension in the knees had the highest incidence (43%), followed by lordosis and winged scapula (39%). The most common injury was to the knee (41%), occurring mostly at T2 and T3, and to the lower back (37%), persisting throughout the data collection period. Strains and 'other' accounted for 39% of the injuries incurred overall (TT). Bowlers were incapacitated approximately one week out of every five due to injury. Workload for the end of the season period (T3) and the season as a whole was found to be statistically significant ($p<0.0005$, $R^2 = 0.619$) between weeks incapacitated and bowling workload. Thirty-eight per cent and 42% of the 46 subjects utilised at least one of the mixed bowling techniques. This study concluded that the significance of fitness, workload and bowling technique all have a multi-factorial role in predisposing a bowler to increased risk for injury. Management of minor injuries and adequate recovery time coupled with adequate preparation would better prepare fast bowlers for the demands of the game.

RESULTS OF MODIFIED LATARJET RECONSTRUCTION IN PATIENTS WITH ANTEROINFERIOR INSTABILITY AND SIGNIFICANT BONE LOSS

De Beer JF, Burkhart SS, Bhatia DN, Van Rooyen KS

Cape Shoulder Institute, Cape Town, South Africa and
The San Antonio Orthopaedic Group, San Antonio, Texas, USA

Purpose. The purpose of this study was to analyze the results of the modified Latarjet procedure for shoulder instability associated with an inverted pear glenoid (bone loss of at least 25% of the width of the inferior glenoid) or an engaging Hill-Sachs lesion.

Type of study. Case series.

Methods. From March 1996 to December 2002, 102 patients underwent an open Latarjet procedure for shoulder instability with inverted pear glenoid, with or without an associated engaging Hill-Sachs lesion, by the two senior authors (JFD and SSB), and 47 of them were available for follow-up physical examination. The remaining 55 patients were contacted by telephone or letter to see if they had had recurrent dislocation or subluxation. Mean age of the patients was 26.5±6.6 years (range 16 - 41). There were 46 male patients and 1 female patient. Pre-operative mean forward elevation was 177.2±13.6 degrees (range 90 - 180) and mean external rotation with the arm at the side was 55.3±16.1 degrees (range 0 - 80). All patients had a pre-operative positive apprehension sign. The median number of dislocations before surgery was 6, with 20 patients having had more than 15 dislocations pre-operatively.

Results. The mean follow-up time for the 47 patients who were personally examined was 59.0±18.5 months (range 32 - 108). Postoperative mean forward elevation was 179.6±2.0 degrees (range 170 - 180, gain of 2.4 degrees) and external rotation with the arm at the side was 50.2±12.6 degrees (range 22 - 78, loss of 5.1 degrees). As for postoperative functional scores, the average Constant score was 94.4 and the average Walch-Duplay score was 91.7. None of these 47 patients showed any further dislocation and 1 of them still had a positive apprehension sign (2.2%) indicating subluxation. However, 4 patients out of the total 102 that underwent the modified Latarjet procedure had a recurrence. With 4 recurrent dislocations and 1 recurrent subluxation, there was a 4.9% recurrence rate. The

4 patients with recurrent dislocations were not among the 47 who returned for personal follow-up evaluation.

Conclusions. The two senior authors (SSB and JFD) have previously reported an unacceptably high recurrence rate (67%) for arthroscopic Bankart repair in the presence of an inverted pear glenoid with or without an engaging Hill-Sachs lesion. They have recommended an open modified Latarjet procedure in such patients. The present study confirms the validity of that recommendation, since the same two surgeons have had only a 4.9% recurrence rate in that same category of patient at an average follow-up of 59 months. Furthermore, the results of this study demonstrate the efficacy of the modified Latarjet procedure in the extremely challenging category of patients who present with such dramatic bone loss that soft-tissue reconstruction, either open or arthroscopic, is not a reasonable option.

OVERUSE INSERTIONAL TENDINOPATHY OF PECTORALIS MINOR MUSCLE IN ATHLETES

De Beer JF, Bhatia DN, Van Rooyen KS

Cape Shoulder Institute, Cape Town, South Africa

Background. Tendinopathies of the rotator cuff muscles, biceps tendon and pectoralis major muscle are common causes of shoulder pain in athletes.

Aim. We describe the clinical features and diagnostic tests of an overuse insertional tendinopathy of the pectoralis minor muscle. A new technique of ultrasonographic evaluation and injection of the pectoralis minor muscle/tendon is presented.

Methods. This paper analyzes the aetiological factors, diagnostic tests, and results of treatment modalities in patients presenting with this condition.

Results. Medial juxta-coracoid tenderness, a painful active-contraction test and bench-press maneuver, and decrease in pain after ultrasound-guided injection of a local anaesthetic agent into the enthesis, in absence of any other clinically/radiologically apparent pathology, were diagnostic of pectoralis minor insertional tendinopathy. All patients were successfully treated with a single ultrasound-guided injection of a corticosteroid into the enthesis of pectoralis minor followed by a period of rest and stretching exercises. Detailed results will be discussed.

Conclusions. Overuse insertional tendinopathy of the pectoralis minor muscle is an under-diagnosed condition. We recommend use of ultrasonographic techniques to identify and treat this condition.

THE ASSOCIATIONS BETWEEN PHYSICAL INACTIVITY, OTHER HEALTH RISK FACTORS AND MEDICAL EXPENDITURE IN A SOUTH AFRICAN HEALTH CARE PLAN

de Busser NL, Hagemann G, Peters-Futre EM

Department of Physiology, School of Medical Sciences, Faculty of Health Sciences, University of KwaZulu-Natal

Background. No publications describing the medical costs of physical inactivity and other health risk factors are available in a South African context.

Aims. To assess medical expenditure related to physical inactivity and other health risk factors in a South African health care plan and to determine possible associations between these variables.

Method. Members of Bankmed Medical Scheme who completed a Health Risk Assessment (HRA) during 2005 (n = 7 133), qualified for this study. Raw data regarding GP, pharmacy, hospital, total medical and total health care claims, levels of physical activity, body mass index (BMI), cigarette smoking status, blood pressure, total serum cholesterol concentration, random glucose concentration, dietary habits index, stress index, depression index and alcohol consumption were used for this analysis.

Results. Physical inactivity was significantly associated with the female gender ($\chi^2 = 118.7$; $p < 0.001$), BMI ≥ 30 kg.m-2 ($\chi^2 = 25.6$; $p < 0.001$), moderate to high stress ($\chi^2 = 23.0$; $p < 0.001$), moderate depression ($\chi^2 = 36.2$; $p < 0.001$) and low dietary indices ($\chi^2 = 68.7$; $p < 0.001$). Statistically significant associations ($p < 0.001$) were found to exist between health-related claims and the 40 - 60-year age category, female gender, obesity, random plasma glucose concentrations > 6.5mmol.l^{-1}, total serum cholesterol concentrations > 5mmol.l^{-1}, moderate to high stress and depression indices and high dietary habits indices only.

Conclusions. The findings of this cross-sectional survey suggest that female gender, a BMI ≥ 30 kg.m^{-2}, inappropriate dietary habits, and high indices of stress and depression, are more significantly associated with a lower medical expenditure than physical inactivity.

SPINAL CORD INJURIES IN SOUTH AFRICAN RUGBY UNION: NEW INCIDENCE DATA AND IMPLICATIONS FOR INJURY PREVENTION

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In response to a growing concern about the apparent increase in catastrophic rugby-related injuries in recent years in South Africa, a research study was commission by the Chris Burger/Petro Jackson Players' Fund to investigate these injuries further. Although injury data on Players' Fund recipients have been collected, there are presently no incidence data on rugby-related spinal cord injuries in South Africa. The aims of the study were to: (1) establish a database of these injuries that have occurred in South Africa since 1980, and (2) use this database to identify players' demographics, and the distribution and determinants of spinal cord injuries. Guided by research conducted in other countries, a questionnaire was designed in consultation with key informants involved in sports medicine and rugby. This questionnaire has collected the following data: players' demographics, level of play, pre-conditioning, circumstances of and other factors contributing to the injury, medical treatment received, and pathology and mechanism of injury. Statistical analyses will be performed to identify associations between these factors. These associations along with general injury data will be presented, and injury trends will be identified. These findings will be discussed in light of existing rugby injury prevention strategies in South Africa, along with new prevention strategies currently being developed. Due to the lack of previous research in this area, this presentation will contribute new insight and is a vital step towards addressing these types of serious injuries that have placed South African rugby in the spotlight in 2007.

HUMERAL AVULSION OF GLENOHUMERAL LIGAMENTS: AN UNDER-RECOGNIZED PATHOLOGICAL LESION IN RECURRENT GLENOHUMERAL INSTABILITY

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Background. Recurrent glenohumeral instability is usually attributed to the 'Bankart/Hill-Sachs lesions' with or without associated bony defects. An under-recognized lesion responsible for this condition is an avulsion of the inferior glenohumeral ligament from its humeral attachment (HAGL).

Aim. We describe the clinical features, diagnostic tests and management of avulsion of the humeral attachment of inferior glenohumeral ligaments in 26 athletes presenting with recurrent shoulder instability.

Methods. Case series, level IV.

Setting. Cape Shoulder Institute, Cape Town, South Africa.

Results. Detailed results will be discussed.

Conclusions. HAGL lesion is a surgically treatable condition. The clinical test devised by the senior author (JdB) should draw attention of the clinician to this condition. The minimally invasive technique

described in this paper permits quicker rehabilitation and early return to sporting activity.

A BIOMECHANICAL, ANTHROPOMETRICAL AND PHYSICAL PROFILE OF THE NORTH WEST UNIVERSITY CLUB NETBALL PLAYERS

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Background. The reviewed literature states that biomechanical deviations and anthropometry status could influence a netball player's performance (motor abilities) as well as the probability of injuries.

Aim. The aim of the study was to determine the physical profiles of 40 club netball players between the ages of 18 and 23 years from the North West University, with reference to the biomechanics, anthropometric measurements and motor abilities (balance, agility and explosive power).

Method. The netball players were assessed at two testing occasions (pre-season and end-season) for biomechanical abnormalities, anthropometry and motor abilities. The results of the end-season testing procedure will be discussed. The players were divided into three groups: player position (centre or goal player); junior and senior players; and A- or B-grade players. Descriptive statistics were calculated and interpreted.

Results. The results of the pre-season testing procedure of the *biomechanical analysis* of the total group presented that the following tests reported non-ideal findings for a significant percentage of the participants: ITB mobility test (57.5%); patella tilt test (63.9%); patella height test (88.9%); transverse foot arch comparison test (94.3%); toe positional test (94.3%); leg length discrepancy test (65.7%); ASIS and PSIS comparison test (62.9%); pelvic rami positional test (62.9%); bilateral pelvis positional test (91.4%); lumbar area assessment (91.4%). Comparing the biomechanical results of the centre players to the goal players, large effects (d≥0.5) were detected at the following tests: longitudinal foot arch status test (d=0.79); lumbar area assessment (d=0.54). When comparing the junior to the senior players the large effect sizes (d≥0.5) were recorded with the following tests: ASIS and PSIS comparison tests as well as the pelvic rami positional test (d=0.54). The comparison between A- and B-grade players presented significant differences with the Q-angle test (d=0.5); VMO - L comparison test (d=0.70); bilateral pelvis positional test (d=0.50). No significant differences could be detected with the *anthropometry evaluation* between the groups. In terms of the *motor ability* tests, the A-grade players showed superior explosive power abilities while the B-grade players performed better with the balancing tests.

Conclusion. Evidently, netball players have significant biomechanical deviations, especially in the lumbo-pelvic area and the ankle complex.

CONSTRUCTING INNOCENCE OF DOPING BY A PROFESSIONAL CRICKET PLAYER

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Professional sport has an extremely competitive nature. To deal with the pressures of competitive sport, some athletes knowingly or unknowingly get involved in the use of prohibited substances. In 2003 the professional cricket player, Shane Warne, was suspected of doping and subsequently convicted thereof. Warne delivered three press statements to the media pertaining to the alleged doping and subsequent conviction thereof. These press statements were treated as narratives which assisted Warne in making sense of his doping experience, which were analyzed by means of narrative analysis. From the narrative analysis it would seem that Warne constructed himself as innocent of doping by means of his physical condition, ignorance pertaining to prohibited substances, his personal position towards doping, the incomplete testing procedures and disciplinary hearing, as well as his lack of transparency towards the media. Despite being found legally guilty of doping, Warne still continued to construct himself as innocent of doping in his last press statement. It would seem that the legal process of the Australian Cricket Board and the Australian Sports Drug Agency did not coincide with the psychological process of Warne in moving from being the 'greatest spin bowler the game has ever seen' to being the 'greatest spin bowler the game has ever seen, with a doping record'.

COMPARISON OF CARDIORESPIRATORY FITNESS INDICATORS IN OTS AND NON-OTS ATHLETES

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Background. A state known as overtraining syndrome (OTS) may occur in athletes of all ages and at all levels. This can be the result of excessive training both in volume and intensity in combination with inadequate recovery. The diagnosis of OTS is primarily based on decreased sport-specific performance and pronounced mood disturbances in absence of organic causes. It has been reported that in an incremental graded test procedure, the VO_{2max} of over-trained athletes tends to be reduced when compared with non-OTS athletes.

Aim. The aim of this study was to compare the BMI, VO_{2rest}, VO_{2rec}, HR_{rest}, HR_{max}, HR_{rec}, RPE and the mean VO_{2max}, as measured in endurance athletes diagnosed with OTS, with values of healthy endurance athletes.

Statistical analysis. Statistical comparisons between the two groups were made with the Mann-Whitney non-parametric test. This test is suitable for small samples of different sizes.

Method. The BMI, VO_{2rest}, VO_{2rec}, HR_{rest}, HR_{max}, HR_{rec}, RPE and the mean VO_{2max} of 33 endurance athletes were measured. Eleven of the athletes were diagnosed with OTS, based on a list of symptoms such as low-grade psychological and psychosomatic symptoms (anger, fatigue, tension, loss of appetite); short-term sleep problems and muscle fatigue; immunological or hormonal disturbances such as menstrual irregularities and more severe symptoms such as depression, severe long-term insomnia, long-term muscle soreness or abnormal sense perceptions.

Results. No significant differences ($p<0.05$) were found between the OTS group and the non-OTS group for VO_{2max}, VO_{2rest}, VO_{2rec}, BMI, HRSTD, HR_{max} and RPE. However, resting heart rate and recovery heart rate were significantly different between the two groups.

Conclusion. The results from this study do not support the claim that VO_{2max}, VO_{2rest} or VO_{2rec}, are indicators of OTS. In this study the resting heart rate and recovery heart rate differentiated strongly between OTS and non-OTS athletes. However, the results must be confirmed with larger samples.

A PILOT STUDY COMPARING THE EFFECT OF EITHER AEROBIC OR RESISTANCE TRAINING ON BLOOD LIPID PROFILE

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Despite the known dose-response effect between increasing physical activity levels and a reduction in chronic diseases of lifestyle, physical inactivity and sedentary living are on the increase globally. The relationship between lipid profiles and coronary heart disease (CHD) has been studied extensively and more active individuals are less likely to develop CHD. Additionally, physical activity and avoidance of obesity are both currently advised as measures to prevent CHD. Several studies have found a link between sedentary living and

increased blood lipid levels and yet there is very little evidence for a positive impact of exercise participation on changing blood lipid profiles. Of the studies which have been done, most have focused on aerobic training and the results have been inconclusive. Therefore, the purpose of this pilot study was to assess changes in blood lipid profile in response to either an aerobic or a resistance programme in order to determine the most appropriate research design for a larger experiment. Previously sedentary males (4) and females (10) with a mean age of 50.17 years and all with increased blood lipid levels were referred by a specialist physician. Baseline data, including stature, mass, girth measures, body composition and a pre-training full blood lipid test, were obtained. Subjects were then randomly assigned to either an aerobic endurance exercise protocol or a progressive resistance training protocol. Each protocol required three weekly sessions for a minimum period of 4 weeks (or 12 sessions). Blood lipid levels and all baseline tests were repeated at 4 weeks, 8 weeks and 12 weeks. Results indicate that total cholesterol, high-density lipoprotein and low-density lipoprotein all showed modest decreases as soon as 4 weeks, while triglyceride content showed a marked decrease at the 4-week mark after progressive resistance training. Body mass (kg) remained stable, with a mean reduction of 1.09kg after 4 weeks of exercise sessions. In conclusion this preliminary study found that both types of training had a positive effect on blood lipid content, in as little as 4 weeks, with further improvements after a further 4 weeks of regular supervised training. Particularly noteworthy was that the resistance training protocol showed additional benefits of a reduced triglyceride content.

AN ANALYSIS OF PATIENT LOAD DATA FROM THE 2003 CRICKET WORLD CUP IN SOUTH AFRICA

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The purpose of this study was to evaluate the patient presentation data for spectators attending the Opening Ceremony and the 2003 Cricket World Cup matches played in South Africa in order to provide organizers with the basis of a sound medical-care plan for mass gatherings of a similar nature. Data were collected on the spectators presenting to the medical facilities during the Opening Ceremony and the 42 matches played in South Africa. This included the total number of patient presentations and the category of illness/injury and was used to determine the venue accommodation rate and the patient presentation rate. The illness/injury data were classified into the following: (1) heat-related illness, (2) blisters/ scrapes/ bruises, (3) headache, (4) fractures/ sprains / lacerations, (5) eye injuries, (6) abdominal pain, (7) insect bite, (8) allergy-related illness, (9) cardiac disorders, chest pains, (10) pulmonary disorder/shortness of breath, (11) syncope, (12) weakness/ dizziness, (13) alcohol/drug related, (14) seizure, (15) cardiac arrest, (16) obstetric/gynaecological disorder, and (17) other. The total number of patients who presented to the medical stations was 2 118, with a mean of 50 (range 14 - 91) injuries per match. The mean for the patient presentation rate was 4/1 000 spectators. The most frequently encountered illness or injury was headache (954 patients, 45%), followed by fractures, sprains and lacerations (351 patients, 16%). The unique nature of cricket has shown a different patient presentation rate than other similar mass gatherings, requiring additional factors to be considered when developing a medical-care plan.

AN ANALYSIS OF PATIENT LOAD DATA FROM THE TEAMS COMPETING IN THE 2003 CRICKET WORLD CUP IN SOUTH AFRICA

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The purpose of this study was to evaluate the injury presentation data for the teams taking part in 10 warm-up matches and 46 matches during the 2003 Cricket World Cup played in South Africa, in order to provide organizers with the basis of a sound medical-care plan for future tournaments of a similar nature. The data collected included the role of the injured person, the nature of the injury, whether the treatment was for an injury or an illness, whether the injury was acute, chronic or acute on chronic and the prognosis. The medical personnel in charge of the medical support documented patient information which included the total number of patient presentations and the category of illness/injury. Ninety presentations (1.6 patient presentations per match) were recorded. The most common presentations were by the batsmen (50%), followed by the bowlers (29%) and all-rounders (17%). Of the presentations 53% were classified as injuries, while the remaining 47% were classified as illnesses. The presentations occurred in the early stages of the competition. The most common presentations were of an acute (57%) nature. The main pathology categories of the injuries were trigger point (10%), bruises/abrasions (10%), while infection (28%) was the main illness pathology. The 2003 Cricket World Cup proved to be an ideal opportunity to collect data of international cricketers participating in an intensive six-week international competition and the epidemiological data collected should assist national cricket bodies and organisers of future Cricket World Cup competitions to predict participant-related rates.

LACERATIONS SUSTAINED IN RUGBY

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The purpose of this presentation is to discuss the variables and factors which have the most significant impact on the occurrence of lacerations in rugby. Aspects on which the focus will be are the playing conditions, the phase of the game during which the injury was sustained, the anatomic part affected by the injury, the impact of protective gear and the rugby player's position on the field. The research population was the 720 matches played during the 2003/2004 season at Coetzenburg in Stellenbosch. It includes a total of 506 injuries, of which 126 were lacerations. This study can be compared with the one by Jakoet and Noakes based on the World Cup of 1995. They made use of 55 matches with 70 injuries and 19 lacerations. With the assistance of rugby coach Dawie Snyman my study's conclusions were interpreted from both a medical and technical rugby point of view. The conclusions which will be discussed, include the following: that the lacerations constituted about 25% of all rugby injuries; more injuries are sustained in dry weather conditions and with an expansive game played, than in wet conditions, and in tight situations such as scrums and line-outs; lacerations are suffered mainly as a result of tackles and clashes, and not in dirty play; the players most exposed are the open-end flanker, followed by the right-wing and the left-lock. Finally, the forwards and backline are equally prone to lacerations, and not the forwards as is generally anticipated. The effect of protective gear on preventing lacerations will be discussed in detail.

FITNESS LEVELS OF FEMALE BALLET DANCERS

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Background. Although an art form, dance requires high physical and mental demands. Injuries among ballet dancers are common and may even have long-term health consequences. Weaknesses in one or more fitness components may potentially put dancers at risk of injury.

Aim. The aim of the study was to explore selected fitness components in top-level female ballet dancers. Seventeen ballet dancers from the South African Ballet Company took part in the study. Their ages ranged from 19 to 38 years (25.3 ±4.9 yrs).

Method. The following fitness components were determined using standardized methods. Resting blood pressure and heart rate were determined by auscultation and palpation using a mercury sphygmomanometer. Body composition was calculated using a restricted anthropometrical profile, which included six skinfold measurements. Flexibility of the hip and ankle joints was evaluated using a Leighton Flexometer and an inclinometer. Cardiovascular fitness was determined using the Bruce protocol to predict VO_{2max}.

Results. The average systolic blood pressure for the group was 112.2 mmHg (±10.2) and 71.8 mmHg (±9.4) for diastolic blood pressure. Resting heart rate was 72.1 (±7.6 bpm) and thus the average rate-pressure product was 81.27 (±13.59). Body mass index was 19.39 (±1.05 kg/m2) and percentage body fat 15.48 (±2.03 %). Flexibility of the hip and ankle joints are presented in detail, with interesting findings reported. The cardiovascular fitness or VO_{2max} of these dancers was 35.2 (±4.3 ml/kg/min).

Conclusion. While the results for body composition and flexibility compared well with those of researchers, the cardiovascular fitness components were slightly lower than previously reported.

ALTERATIONS IN SALIVARY CORTISOL AND (α-AMYLASE CHARACTERISE THE STRESS RESPONSE TO DOWNHILL RUNNING

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Background. The physiological events underlying the response to 'stress' include activation of the hypothalamic pituitary adrenal (HPA) axis and/or the activation of the sympathoadrenal (SA) system. Examination of both the relative and temporal activation of the HPA axis and SA system is key to understanding adaptive and mal-adaptive responses to stress.

Aim. The present study aimed to characterise the HPA axis and SA response to a bout of downhill running.

Method. Eleven untrained males performed a 60 min bout of downhill running (-13.5% gradient), at a speed eliciting 75% of their VO_2 peak on a level grade. Saliva samples were collected before, immediately after (IPE), and every hour for 12 h and every 24 h for 6 d. Salivary cortisol and (α-amylase levels were measured as markers of the HPA and SA response respectively. Data were analyzed using a repeated measures ANOVA (12 h period: 1 X 14; 24 h intervals 1 X 6, $p \leq 0.05$).

Results. There was a significant ($p < 0.05$) time effect, with salivary cortisol levels lower from 2 - 12h and (-amylase levels higher from IPE-2h, compared with baseline.

Conclusion. The stress response to 60 min of downhill running is characterised by the dominance of the SA system over the HPA axis for the first 12 h after exercise. Surprisingly, cortisol levels were not elevated and followed the normal diurnal rhythm observed during rest. The finding that (-amylase level was more significantly increased and reacted more rapidly than cortisol, suggests that it may be a better index of the stress response.

COMMON LOWER EXTREMITY INJURIES IN FEMALE HIGH SCHOOL SOCCER PLAYERS IN JOHANNESBURG EAST DISTRICT

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Background and purpose of research. As the number of females participating in sports has increased so has the necessity of understanding the effect of female growth and development in participation, athletic ability and injury patterns. Soccer is one of the sports where South Africa has seen an increase of youth and adult females' participation.

Aim. To establish the prevalence and risk factors of lower extremity injuries in female high school soccer players in the Johannesburg east district.

Method. A retrospective questionnaire-based descriptive study with 103 first-team high school female soccer players from nine high schools in the Johannesburg east district.

Results. The one year prevalence of injuries was 46.1% and point prevalence was 37.8%. For one year prevalence knee injuries (18.6%) and ankle injuries (17.6%) were reported and for point prevalence knee injuries (13.3%) and ankle injuries (18.9%). The defenders (31%) and midfielders (26%) reported more injuries. An extended duration of skills ($p=0.0001$) and fitness ($p=0.02$) training reduced the likelihood of incurring an injury and the older ($p=0.01$) the players, the more chances of sustaining injuries. The players who wore shin guards were less prone to shin/leg injuries ($p=0.01$) and the relative odds were 0.35 (CI 0.16-0.79). The midfielders had more foot and toe injuries ($p=0.05$). Starting age ($p=0.78$), frequency of play ($p=0.83$), player position ($p=0.2$) and wearing of shoes ($p=0.54$) had no influence on injury.

Conclusion. Increasing the duration of skills and fitness training as well as wearing of shin guards in female soccer players in high school may reduce the likelihood of incurring injuries in the lower extremities.

HOW DO PHYSIOTHERAPISTS AND ATHLETES TALK ABOUT PAIN DURING THE FIRST CONSULTATION?

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Aim. The research question in this thesis considered how physiotherapists and athletes talk about pain in the first consultation. Drawing on eight audio-recorded consultations, collected at a sport physiotherapy practice, this thesis examined and described the action orientation of this pain talk; it examined the situated and occasioned nature of the talk; and finally it examined how pain was constructed and made relevant in the physiotherapist-athlete interaction. Thus injury pain was studied for how it was invoked as part of the interactional work that took place in the physiotherapy setting.

Method. This thesis approached pain discursively, where the focus was on language and how athletes and a physiotherapist used discursive practices within particular contexts to talk about injury pain. This entailed examining the first physiotherapy consultation between athlete and physiotherapist after a new sporting injury, where pain was handled as part of the action that the physiotherapist and athlete performed in this consultation.

Results. The above included the way pain was introduced, defined, described, and made relevant to the business of the physiotherapist setting, as pain is a central focus of concern in this medical institutional setting. The analysis illustrated the complex and delicated nature of injury pain where this delicacy and complexity emerged through the following analytical themes. Firstly, the request-response sequence: introducing and asking about pain, where the request for physical action, action that may cause the athlete pain, is prefaced by a warning and the physiotherapist does not request a physical action that is likely to cause immediate pain straight away. Secondly, pauses as invitations to talk, and it were found that pauses could be used to accomplish certain actions in the physiotherapy consultation. Pauses can function as invitations to talk or to assist a physiotherapist and athletes in managing interactional difficulty that surrounds injury presentation. Thirdly, dissociation and pain: 'that pain and those shoulders' and this theme illustrated how words like 'that, those, the, it' can be used as impersonal constructions to create distance between the athlete and the injured body part. This distance can be constructed as a means to manage injury pain. Fourthly, the role of laughter in pain talk, where laughter can be a way to manage troubled talk in the physiotherapist-athlete interaction

Conclusion. In conclusion, this thesis has shown through a focus on discourse, that pain is something that athletes *do* rather than something they *have*. One of the limitations of this thesis is that the data were collected by using audio recordings and no video recordings were used. One of the most pertinent recommendations for future research will, therefore, be the use of video data to capture the role of pauses within the physiotherapist-athlete interaction. Video data could thus assist the researcher in further understanding the role of pauses played in pain talk.

ANTIOXIDANT (OXIPROVIN™) SUPPLEMENTATION AND MUSCLE RECOVERY FROM CONTUSION INJURY - AN *IN-VIVO* RAT MODEL STUDY

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Background. Oxiprovin™ grape seed extract contains free radical scavenging agents (proanthocyanidins: OPCs). OPCs inhibit oxidative tissue damage better than vitamins C and E or β-carotene in mice.

Aim. To investigate the effect of Oxiprovin™ supplementation on skeletal muscle recovery after contusion injury in rats.

Methods. Forty Wistar rats were divided into 2 groups, orally gavaged with either Oxiprovin™ (Oxi, 20 mg/kg/d) or vehicle (P, saline 1 ml/kg/d) starting 2 weeks prior to injury. Control animals (C, n=8) were sham-prepared, but not injured. The remaining animals (I, n=32) were anaesthetised and injured non-invasively on one gastrocnemius using the drop-mass technique (200g from 50cm). Muscle was harvested at 4 h, 3, 7 and 14 days later, fixed and embedded in paraffin wax. Sections were stained using 3 satellite cell (SC) markers (including CD56 expressed by activated SC) and fetal myosin heavy chain (MHC*f*) (marking regenerating fibres).

Results. Oxi-I had significantly more $CD56^+$ SC in the border zone soon after injury (Oxi-C: 0.025 ± 0.006 v. Oxi-I 4 r post: 0.233 ± 0.035 SC/myofibre, $p<0.001$). Increases were not seen in P-I until day 3 (0.101 ± 0.006 SC/myofibre, $p<0.001$). MHC*f* positive fibres were significantly higher in Oxi-I by day 3 (v. Oxi-C or P-I day 3, $p<0.001$), but not until day 7 in P-I ($p<0.001$).

Conclusion. Chronic Oxiprovin™ supplementation significantly increased satellite cell activation and mobilisation to the injury site early after injury and reduced the time to myofibre regeneration after skeletal muscle contusion injury in rats.

ULTRASOUND-GUIDED BOTOX INFILTRATIONS FOR PROTECTION OF ROTATOR CUFF REPAIR

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Subject. Botulinum toxin (BT) has been used in many facets of surgery, with cerebral palsy being the best known. A recent report of its use in preventing recurrence of contracture following elbow releases reinforced the senior author's thoughts that using the toxin may help in protecting the rotator cuff repair.

Materials and Methods. Patients presenting to the senior author with symptomatic rotator cuff tears, confirmed on ultrasound by an experienced musculoskeletal sonographer, requiring surgery, were offered BT as a method of immobilising the infraspinatus and supraspinatus muscles chemically. The experimental nature of this and the benefits/risks were discussed. The patients who agreed underwent ultrasound-guided BT infiltrations into the infraspinatus (100 IU) and the supraspinatus (100 IU) muscles 2 weeks prior to surgery. The reason for the 2-week delay to surgery was to prevent any possibility of infection and to be sure that the muscles were paralysed. The patients had an ultrasound the day prior to surgery to confirm the paralysis. The surgery was a rotator cuff repair using a single row of anchors. They all had an acromioplasty. The patients were placed in a shoulder immobiliser for 2 weeks for comfort. The patients were followed up at 2, 6 and 12 weeks with an ultrasound to image the repair and to see if the muscles were contracting.

Results. Sixteen patients, average age 53yrs, 10 males, 10 tears of between 1 and 3 cm and 6 tears greater than 3cm. The follow-up was from 3 to 22 months. All muscles were contracting by 3 months. Fourteen had healed rotator cuffs on ultrasound, with 2 failed repairs. The first was a partial thickness tear at 6 weeks; the patient was already doing push-ups. The second was in a woman with diplegic cerebral palsy who at 2 weeks had an unconfirmed sepsis treated with antibiotics. This settled but she had a confirmed tear on ultrasound.

Conclusion. The repairs held in 87% of cases despite early motion. We also found that the patients experienced very little pain in the post- operative period.

METABOLIC SYNDROME AND ASSESSING CARDIOVASCULAR RISK IN CHILDREN AND ADOLESCENTS

Patel D N

Discovery Vitality and Morningside Sports Medicine

There is increasing recognition that many diseases of adulthood have their genesis in childhood. Of particular concern are cardiovascular diseases which exact a huge toll on adults and particularly the elderly. There is compelling evidence that coronary and other arterial disease begin in childhood and may even, in some individuals, be predisposed to in the fetal and early neonatal periods.

Fattening diets, sedentariness, smoking and obesity are the key contributors to the increase in cardiovascular diseases in adults. These factors are also increasingly present in children and adolescents. The increase in the incidence of obesity in children and adolescents is a portent for the wave of chronic diseases that is certain to engulf the next generation of adults.

This paper reviews:

* The causes of early cardiovascular diseases in childhood and adolescents

* The pathophysiology of vascular endothelial dysfunction and type 2 diabetes mellitus in adolescent obesity

* Clinical and laboratory evaluation of future cardiovascular risk in children and adolescents

* Current diet and physical recommendations for children.

Conclusion. Given the staggering human and economic costs of chronic diseases of lifestyle it is imperative that health care professionals are able to assess future risk of these diseases and recommend preventive strategies to counter these risks in young patients.

EFFICACY OF RESISTANCE TRAINING ON AEROBIC FUNCTION AND PERCEIVED EXERTION IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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Background. Aerobic exercise training (walking, running or cycling) is commonly utilized in diabetes to normalize blood glucose levels by decreasing insulin resistance. However, progressive resistance training (PRT) has recently been recognized as a useful therapeutic tool for the treatment of a number of chronic diseases, including type 2 diabetes mellitus. PRT has been reported to increase muscle strength, lean muscle mass, bone mineral density and to enhance insulin sensitivity, which thus enhances mobility, functional status and glycaemic control.

Aim. To determine the efficacy of a PRT programme on aerobic function and fatigue in a cohort of 80 male and female type 2 diabetics

between the ages of 40 and 65 years, recruited from the outpatient clinic at the Mamelodi Hospital.

Methods. A pre-test post-test randomized controlled trial design was adopted for the study. The PRT programme took place over 20 weeks, utilizing dumb-bells, therabands, exercise balls and own body weight on 2 non-consecutive days per week. Sessions comprised 3 sets of 6 - 12 reps at 50 - 80% intensity of 1RM, with duration of 30 - 60 min.

Results. Pre-post 6-minute walk results showed a significant ($p \leq 0.0001$) mean (±SD) increase in the distance walked by both the PRT group and controls (CT) of 121.7 (140.77) and 86.63 (98.9) m, respectively. After 20 weeks, ratings of perceived exertion (RPE) in the PRT v. CT for the 6- min walk showed lower indices of pre-exercise dyspnoea (0.25±0.52 v. 0.48±0.94) and fatigue (0.21±0.42 v. 0.63±0.87; $p \leq 0.01$) and similar post-exercise dyspnoea (1.95±1.28 v. 1.98±1.61) and fatigue (2.03±0.97 v. 2.3±1.8) - despite the PRT subjects being able to cover a greater distance in the 6 min.

Conclusion. Results suggest that PRT had positive influence on aerobic function and RPE, although a more optimal dose-response would improve the efficacy of the modality.

CURRENT TRENDS IN THE TREATMENT AND PREVENTION OF LOWER EXTREMITY INJURIES: A FOCUS ON ANTERIOR CRUCIATE LIGAMENT INJURIES

Jo-Dee Pryce

The purpose of this presentation is to explore the current trends in the treatment and prevention of lower extremity injuries, specifically ACL injuries in female athletes. Treating the proposed underlying mechanisms of lower extremity dysfunction as opposed to treating the symptoms.

An overview of the current thinking regarding potential risk factors in females as well as intervention strategies will highlight the significant reductions in ACL injury rates seen.

A SURVEY ON THE OUTCOMES OF BLADDER/URINARY MANAGEMENT IN PATIENTS WITH SPINAL CORD INJURY, WHO WERE REHABILITATED AT MUELMED REHAB FROM JANUARY TO DECEMBER 2006

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The aim of this survey was to determine patient satisfaction about their method of bladder management, and the incidence of urinary tract infections with the different methods used. All patients who were admitted and rehabilitated at Muelmed Rehab were followed up telephonically and asked to answer a few questions regarding their bladder management. Our statistics showed that of the tetraplegic patients, 39% had suprapubic catheters, 39% had urethral indwelling catheters and 6% were doing self-catheterization. With the paraplegic patients we had 33% on self-catheterization, 30% on urethral catheters and 18% on suprapubic catheters.

Findings. Only 10 % of these patients changed their method of bladder management since discharge. The incidence of UTIs in both paraplegics and tetraplegics was found to be higher in patients with urethral catheters (60% and 57% respectively) as compared with those with suprapubic catheters (50% and 43% respectively). The incidence of UTI is even lower in patients on intermittent self-catheterization (28% and 0%).

Conclusion. A higher percentage of paraplegics are discharged on self-catheterization, then urethral catheters and the least on suprapubic catheters. The incidence of UTI is much lower in patients on self-catheterization than in those with any form of indwelling catheters. Suprapubic catheters offer a slightly lower incidence of UTI than urethral catheters, even in tetraplegics. The low incidence in our patients who changed their bladder management since discharge indicates that our bladder management and training have been adequate.

Injury profile of patients admitted to Muelmed in 2006

Type of injury	Patients (N)	%
Paraplegic	81	36
Tetraplegic	51	23
Head injury	51	23
CVI (stroke)	22	10
Others	17	8
Total	222	100

Bladder management method in spinal cord injuries at Muelmed

Type of injury	Suprapubic catheter	Urethral indwelling	Self-catheterization	Normal	Other methods
Paraplegic	18%	30%	33%	12%	6%
Tetraplegic	39%	39%	6%	16%	

Incidence of UTI in spinal patients at Muelmed

Injury type	Urethral catheter	Suprapubic catheter	Self-catheterization
Paraplegic	60%	50%	28%
Tetraplegic	57%	43%	0%

DOES REGULAR USE OF A MAGNETIC BREATHING DEVICE IMPROVE ATHLETIC PERFORMANCE? A RANDOMIZED, PLACEBO-CONTROLLED CLINICAL TRIAL

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Background. Magnetic fields have been shown to alter molecular and cellular parameters, including the hydrogen bonding of water, enzyme activity, gene expression, iron transport and membrane permeability. Magnetic fields have also been shown to affect the central nervous system, cardiovascular system and musculoskeletal system. There has however been little documented research on the possible effects of magnetism on athletic performance.

Objective. The aim of this study was to determine if the regular use of two strengths of magnetic breathing devices (Therahaler (1500G and 3000G)) improved peak power output and exercise time to exhaustion on a maximum cycle test compared with a placebo (Therahaler - non-magnetic coil) after 2 and 4 weeks of usage.

Methods. A multicentre double-blind placebo-controlled trial of one hundred and thirty-one healthy subjects was conducted. Following a baseline maximal cycle test the subjects were allocated one of three devices: placebo (n=52), 1500G (n=44) or 3000G (n=35). The subjects were required to use the device every 30min while awake. They were re- tested after 2 weeks and again after 4 weeks. Measures of outcome were Peak Power Output (PPO), exercise time to exhaustion, heart rate response, Rate of Perceived Exertion (RPE) and visual analogue scale of performance enhancement. Subjects were instructed to document their training volume and intensity as well as daily usage of the Therahaler. There was no significant difference in these parameters between the groups over the 4-week test period.

Results. After 2 weeks there was no significant difference in the PPO. However, after 4 weeks of use there was a significant 13.78%

increase in the PPO in the 1500G group (p=0.0004) compared with a 6.90% increase in the placebo group (p=0.0122); there was no significant change in the 3000G group (p=0.1). After two weeks there was no significant change in exercise time to exhaustion in the three groups (p>0.05); however after four weeks there was a significant improvement in the mean exercise time to exhaustion in all three groups; the mean improvement in the 1500G group was 85 seconds (p<0.0001), in the 3000G group 53 seconds (p=0.027) and in the placebo group also 53 seconds (p<0.001). There was no significant difference in the heart rate response to exercise in the placebo and 3000G group (p>0.1). However, in the 1500G group after four weeks of usage there was a significant reduction in the heart rate after 4.5min and 7 min of exercise (p<0.05). After two weeks there was a significant reduction in the RPE after 4.5min of exercise in the 1500G group (p<0.05), and after 4 weeks there was a significant reduction in the RPE after 4.5min in the 1500G and 3000G group (p<0.05).

Conclusion. It appears that 4 weeks of use of a 1500G Therahaler magnetic breathing device may significantly increase PPO and exercise time to exhaustion. The double-strength device has a similar effect to the placebo; this non-dose dependent effect has also been demonstrated in other magnetic studies and may be due to the resonance of the tissue and magnetic field. The mechanisms behind this increased exercise performance could possibly be due to the effects of the magnetic field on the central nervous system, musculoskeletal or cardiovascular system. Further research is needed in this regard.

SHOULDER PAIN, STRENGTH AND RANGE OF MOVEMENT IN ELITE FEMALE UNDERWATER HOCKEY PLAYERS

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Swimmers' shoulder is a painful impingement syndrome due to chronic overhead microtrauma. Like swimmers, underwater hockey (UWH) players may be at risk to develop shoulder pathology due to the overhead dominant-hand-specific nature of the sport.

Aim.

* Review incidence and nature of shoulder symptoms in UWH players

* Evaluate differences in shoulder muscle performance between players with and without a painful shoulder.

Method. Population: National Elite Ladies UWH squad (n=22). Shoulder goniometric ROM tests, according to American Academy of Orthopedic Surgeons, were performed. Isocom dynamometer concentric isokinetic shoulder rotation strength was performed. Incidence and nature of shoulder symptoms were reviewed with a clinical history questionnaire.

Results.

* 77% played UWH >5 years
* 95% played national team UWH before
* 50% were swimmers before playing UWH
* 77% play UWH >5 hours weekly
* 81% swim >4 km weekly besides UWH games
* 77.3% experience shoulder pain of which
  - 17.6% daily pain during peak season
  - 23.6% intermittent pain all year
  - 53% pain with daily living activities during peak season
  - 45.5% take pain-control medication
* 50% experience grinding with overhead activities
* 18.2% experience instability
* 50% experience impingement
* 36.4% consulted health care workers.

No significant correlation between shoulder pain and range of motion (p>0.05). No significant correlation between shoulder pain and isokinetic rotation strength, power and endurance (p>0.05).

Conclusion. During the peak UWH season, 50% of players with shoulder pain experienced grade IV tendinopathy and the remainder grade I tendinopathy. 50% experienced impingement. Nearly a quarter experienced instability. Majority of the team needs active shoulder rehabilitation.

Recommended interventions:

* Education on prevention, recognition and rehabilitation.

* Swim stroke and video analysis to identify pathological swim stroke mechanics.

* Swimming without full gear. Holding a hockey stick contributes to swimmers' shoulder.

* Head-up and eyes forward position impedes scapulothoracic movement and should be avoided. Peripheral vision exercises recommended.

* Follow-up testing after rehabilitation recommended.

ISOKINETIC SHOULDER ROTATION STRENGTH IN ELITE FEMALE UNDERWATER HOCKEY PLAYERS

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Underwater hockey (UWH) players may be at risk to develop shoulder muscle imbalance due to the overhead dominant-hand-specific nature of the sport.

Swimmers and overhead sports players develop shoulder muscle imbalance because of overuse microtrauma.

UWH players are exposed to repetitive forces on the abducted elevated arm by:

* Moving a puck against resistance

* Opponents trying to take possession of the puck

* Water forces with each overhead swim stroke.

Aim.

* Evaluate shoulder isokinetic concentric internal rotator (IR) and external rotator (ER) strength in dominant hand (DH) v. non-dominant (NDH) hand

* Compare shoulder rotator strength of UWH players with sedentary controls and swimmers.

Method. Comparing DH v. NDH isokinetic shoulder rotation strengths of the National Elite Ladies UWH squad (n=22). Isocom dynamometer concentric isokinetic strength tests at 60° and 120° for shoulder IR and ER performed. Test position: supine, 90° shoulder abduction, to simulate the UWH playing position. Peak torque (PT) is the gold standard for muscle strength testing and correlates with performance in swimmers.

Results.

	% Stronger DH v. NDH	p-value
IR PT 60°	12.85	0.000
IR PT 120°	11.46	0.000
IR/ER ratio 60°	7.66	0.015
ER/IR ratio 60°	11.3	0.004
IR power 60°	10.8	0.000
ER power 60°	7.6	0.002
IR power 120°	13.7	0.000
ER power 120°	11.7	0.000

Significant higher IR and ER PT v. female tennis players, swimmers and sedentary controls. ER is proportionately more increased than IR (p=0.000). Significant lower IR/ER v. swimmers (p=0.000) but significant higher than sedentary controls (p=0.024). Significant higher ER/IR v. swimmers (p=0.007) but significantly lower than sedentary controls (p=0.003).

Conclusion. UWH players demonstrate increased DH IR and ER strength. DH-specific overhead athletes demonstrate only higher DH IR. Swimmers demonstrated no difference between DH v. NDH strength. Increase in IR and ER strength in UWH players is a sport-specific adaptation due to stick work against resistance at extreme-range IR and ER. Follow-up study to evaluate if the different muscle strength ratios are clinical significant in shoulder pathology.

CREATINE KINASE (CK) RESPONSES IN AFRICAN V. CAUCASIAN MALES AFTER A BOUT OF EXERCISE-INDUCED MUSCLE DAMAGE

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Background. Certain athletic events are dominated by African athletes. Performance is to a large extent determined by training, which involves injury and healing adaptations. CK responses may (indirectly) provide insight into how different racial groups respond to strenuous physical activity.

Aim. To compare serum CK responses in an African and Caucasian cohort, before and after a bout of eccentrically biased exercise.

Methods. Nine black and 9 white healthy, untrained males were required to run on a treadmill at -13.5% for 1 h. CK was assessed (Refletron, Boehringer) before, after, 3, 6, 9, 12, 24, 48, 72, 96, 120, 144 h, and then at 7, 14 and 21 d. Results were analysed using a randomised block design ($p<.05$).

Results. For the initial 12 h period there was a race effect ($p=0.0001$) with values for Africans (461 +/- 15 IU/l) being significantly higher than for Caucasians (264 +/- 16 IU/l). For the 24 h periods up to 21d, there was also a race effect, with values for Africans (374 +/- 18 IU/l) again being higher ($p=0.0001$) than for Caucasians (140 +/- 19 IU/l).

Conclusion. Africans had a more pronounced CK response with values for both groups peaking at 12 h. CK values for Caucasians returned to baseline from 72 h, while values for Africans remained elevated through 14 d. These results suggest that Africans experienced more damage compared with Caucasians. Alternatively, the elevated CK levels could have been associated with an exacerbated inflammatory response and a subsequent increase in secondary damage.

THE INFLUENCE OF PLYOMETRIC STRENGTH ON THE OCCURRENCE OF LOWER LEG INJURIES

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Background. One of the aims of medical professionals is to treat sports injuries to the best of their ability and, if possible, to prevent these injuries from occurring. Generally there is limited literature concerning the influence of plyometric strength on injuries.

Aim. To examine the influence of plyometric strength on the occurrence of lower leg injuries.

Method. 240 rugby players from two schools were used as test subjects. All players were tested for plyometric strength by a qualified physiotherapist at the beginning of the rugby season in March 2006 using a vertical jump test, administered using an electronic timing mat. All injuries sustained during the season were evaluated by a qualified physiotherapist at a weekly sports clinic.

Results. During the season, there were 8 players with lower leg injuries. Test values for players with intrinsic injuries were weaker by a practically significant margin for the left + right leg plyometric/ bilateral plyometric ratio. Five out of the six intrinsic lower leg injuries tested weaker by a practically significant margin for right/bilateral and left/bilateral for the respective injured legs.

Conclusion. When the test results of the players sustaining lower leg injuries during the season are compared with the percentile values for the combined descriptive statistics of the two schools involved in this study, it shows that the injured players all fall within the 20th percentile for (left + right)/bilateral and (Injured leg)/bilateral ratios. These values could be used as a standard to determine increased risk of intrinsic lower leg injuries.

ALTERATIONS IN CIRCULATING CELL ADHESION MOLECULES AFTER REPEATED BOUTS OF EXERCISE-INDUCED MUSCLE DAMAGE

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An initial bout of eccentrics induces damage to musculature. When repeated, there is significantly less damage; this adaptation is referred to as the 'repeated bout effect'. One hypothesis that explains this adaptation is related to 'dampening' of acute inflammation. Cell adhesion molecules (CAMs) are central in trafficking of neutrophils; an alteration in expression of CAMs may occur in response to bout 2, altering neutrophil migration. Therefore, the purpose of this study was to compare levels of CAMs before and after repeated downhill running. Six healthy untrained males ran for 1 h down a -13.5% treadmill grade, on 2 occasions separated by 14 d. Venous blood was drawn before, after and at 3, 6, 9, 12, 24, 48 and 72 h after. sICAM-1, sVCAM-1, and sE- sL- and sP-selectin were assessed using commercial ELISA kits (R & D Systems). An ANOVA was used to assess differences between bouts ($p<.05$) for the 12 h period and 24 h periods. During the initial 12 h period: L-selectin for RUN2 (1211 +/- 23 ng/ml) was 10% lower than for RUN1 (1339 +/- 23 ng/ mg); sICAM-1 was 6% lower for RUN2 (350 +/- 7 ng/mg) versus RUN1 (371 +/- 7 ng/mg). During 24 h periods, sICAM was 8% lower for RUN2 (333 +/- 8 ng/mg) compared with RUN1 (363 +/- 8 ng/ mg). Reductions in certain CAMs after bout 2 may result in reduced activation and infiltration of neutrophils to damaged tissue and would support the hypothesis that the 'repeated bout effect' represents, in part, a dampened inflammatory response.

MANAGEMENT OF CERVICAL BIOMECHANICAL DYSFUNCTION IN SCHOOLBOY RUGBY PLAYERS

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Research performed as part of a PhD degree at North West University (Potchefstroom Campus), presenting author working as a clinician in private practice.

Background. Neck injuries in rugby could possibly be reduced by investigating predisposing factors and correcting these where possible. To date very few studies have been conducted where intrinsic predisposing factors for neck injuries were investigated in schoolboy rugby players. The author identified biomechanical dysfunction in schoolboy rugby players as a possible predisposing factor in neck injuries.

Aims. The primary physiotherapeutic aims of the study were to validate a manual physiotherapy evaluation technique in the assessment of cervical biomechanical dysfunction, and to test the effectiveness of a manual physiotherapy treatment technique in the correction of cervical biomechanical dysfunction. The primary educational aims were to test the effectiveness and safety of a

therapeutic exercise programme for the correction of biomechanical dysfunction as well as the effectiveness of a neck rehabilitation programme for improving neck muscle strength.

Sample. The subjects were South African schoolboy rugby players between the ages of 15 and 18 years. Groups 1 and 2 presented with biomechanical dysfunction of their cervical spines, group 3 had no biomechanical dysfunction of their cervical spines and the players in group 4, the control group, presented with or without biomechanical dysfunction of their cervical spines. Each group consisted of 25 players.

Method. Group 1 received manual physiotherapy with X-rays before and after treatment. Groups 2 and 3 performed a therapeutic exercise programme, with before and after X-rays, and group 4 received no intervention between their sets of X-rays. Following the second set of X-rays all the players from groups 1, 2 and 3 performed the neck rehabilitation programme after which a third set of X-rays were taken.

Results. The results validated the manual physiotherapy evaluation technique. The manual therapy treatment technique used in the treatment of group 1 showed highly significant improvements in cervical biomechanical function. Results for group 2 following the therapeutic exercise programme showed moderate practically significant improvements in cervical biomechanical dysfunction. The therapeutic exercise programme for the correction of biomechanical dysfunction was found to be very safe with only small significant changes in X-ray measurements (group 3). The results of the control group showed a negative trend of small statistical significance. A highly significant improvement in cervical circumference as moderate significant improvement in biomechanical function was found following the neck rehabilitation programme.

Conclusion. It could therefore be concluded that the manual physiotherapy evaluation technique for motion segment analysis was indeed valid in determining biomechanical dysfunction of the cervical spine. The manual physiotherapy treatment technique as well as the therapeutic exercise programme for the correction of biomechanical dysfunction was found to be effective in the correction of cervical biomechanical dysfunction. It could further be concluded that the therapeutic exercise programme was safe to be performed by players without biomechanical dysfunction. The neck rehabilitation programme was effective in improving cervical circumference as well as cervical biomechanical function.

THE DEVELOPMENT OF DRIVE FOR THINNESS AMONG FEMALES IN SPORT: A GROUNDED THEORY STUDY

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Background. Empirical investigations have demonstrated that significant drive for thinness pressures are experienced by females in sport. Drive for thinness, referring to an individual's desire to lose weight, has been shown to be one of the major predictors of disordered eating behaviours. As previous literature has strongly advocated the long-term detrimental implications of disordered eating in competitive sport, potential risk factors to these behaviours, including athletes' experiences of drive for thinness, have become a pertinent area of investigation.

Aim. The purpose of this study, therefore, was to examine the process by which drive for thinness is developed among females in sport.

Method. The methodological approach used for the study was a constructivist and symbolic interactionist approach to grounded theory. Semi-structured interviews were conducted with over 40 female athletes, aged 18 - 25, representing a variety of different sports and different sporting levels. Data were analyzed inductively using open, axial, and selective coding procedures.

Results. Results revealed that the development of drive for thinness among female athletes is affected by the culture of sport and particularly the emphasis on performance outcomes. A model of the process by which females develop drive for thinness in sport is proposed, including eight different inter-related stages of augmentation.

Conclusion. Challenges with the prevention of drive for thinness and disordered eating among female athletes are discussed, with a particular emphasis on the integration of sport science knowledge and future directions for best practice in sport.

A REVIEW OF CRICKET INJURIES AND THE EFFECTIVENESS OF STRATEGIES AND MEASURES TO PREVENT CRICKET INJURIES AT ALL LEVELS

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This review critically evaluates the scientific research into cricket injuries, including long-term injury surveillance studies, the consensus statement paper for injury surveillance, specific cricket injuries counter measures to reduce the risk of injury, cricket protective equipment, and finally identifies areas of future concern. The review of the cricket injury literature shows that three major cricket-playing countries have collected long-term injury data. In Australia the surveillance revealed 886 injuries were sustained by players representing the national and state teams. This data were collected retrospectively from 1995 to 1998 and then prospectively from 1998 to 2005. In England the incidence and nature of injuries to professional cricket players reported 990 injuries which were recorded retrospectively from records of a professional county club by the team physiotherapist (1985 - 1995). In South Africa 1 606 injuries to the national and provincial teams were reported prospectively by the physiotherapists and doctors working with the teams from 1998/1999 to 2003/2004. While injury surveillance is fundamental to prevent and reduce the risk of injury, these studies used different injury definitions and methods of collecting and reporting the data which prevented comparisons of injury rates between countries. As a result researchers from six of the major cricket-playing nations, who were involved with cricket injury surveillance, developed a consensus statement paper with regard to definitions and methods to calculate injury rates, incidence and prevalence. This provides a standard which allows meaningful comparisons of injury surveillance data from different countries and time periods which should assist the identification of injury risk factors for cricket. The first study using this newly accepted injury surveillance method showed injury patterns in the West Indies domestic and national cricket teams, with more injuries having occurred when the national team was on tour than when playing at home. This review also covered specific injuries to cricketers, including injuries to the back, particularly the young fast bowler, and injuries to the shoulder, primarily as a result of a front-on bowling and dysfunction of shoulder muscles. Evidence of the effectiveness of injury prevention counter measures was reviewed and reveals trials of interventions to reduce lower back injury in fast bowlers. A three-year educational programme aimed at improving the bowling technique of young fast bowlers showed a reduction in the mixed bowling action, while a bowling harness showed no significant reduction in certain characteristics of the mixed bowling action. A prospective study to evaluate junior fast bowling workload guidelines found that in some cases the workload exceeded that suggested as appropriate for older players and recommended that rest days should be added to the guidelines as bowling more frequently than every three days increases the risk of injury. A brief review of the literature relating to the safety aspects of cricket batting equipment, including helmets, gloves, pads and clothing, indicates that there are areas where improvements need to be made in order to reduce the risk of injury. The implications of the changes to the laws relating to the bowling action and the increased usage of the sliding stop in fielding, particularly by young inexperienced cricketers, were reviewed. From the review it is evident that there is a need to continue with injury surveillance, as well as a need to continue with and increase the

number of studies that evaluate the efficacy of intervention strategies in order to reduce the risk of injury to cricketers.

AD LIBITUM ADJUSTMENT OF FLUID INTAKE IN COOL ENVIRONMENTAL CONDITIONS MAINTAIN HYDRATION STATUS IN A THREE-DAY MOUNTAIN BIKE RACE

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Background. As the available recommendations on fluid replacement are mainly for one-day events, no guidelines for multi-day mountain-bike (MTB) cycle events exist.

Aim. To assess the hydration status of cyclists who voluntarily adjusted their fluid intake to environmental conditions in a three-day, 248 km 2006 Sani2C MTB race.

Method. Eighteen randomly selected amateur, male MTB cyclists were assessed before and after each of the three stages (S1-3) of the race. Exercise-induced changes in body mass as well as self-recorded, voluntary fluid intake and output of urine and serum Na concentration and osmolality were monitored during each cycling stage.

Results. While 77.8% (n=14) of subjects reported a usual intake of > 750 ml. hr^{-1} in MTB events prior to this event, mean (± SEM) fluid intake in this race ranged from 341 (± 32) ml. hr^{-1} during S1 to 408 (± 41) ml. hr^{-1} during S2 and 551 (± 56) ml. hr^{-1} during S3. Changes in mean body mass ranged from 0.7% to 1.1% during the three stages. Mean SO and serum [Na+] did not rise significantly during S1 and S2, but rose from 292 (± 0.73) to 295 (± 1.15) mOsm/kg and from 137 (±0.35) to 140 (±0.42) meq. L^{-1} during S3 ($P < 0.001$).

Conclusion. *Ad libitum* fluid intake during the 2006 Sani2C MTB race which took place in unexpectedly cold environmental conditions was substantially lower than current recommendations. Changes in body mass, SO, serum [Na+] were not clinically significant and indicate that adequate hydration status was maintained.

REPRODUCIBILITY OF BLOOD LACTATE TRANSITION THRESHOLD IN PERSONS WITH METABOLIC SYNDROME

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Metabolic syndrome (MetS) is currently used extensively as a significant predictor of cardiovascular disease and type 2 diabetes mellitus. MetS is a multi-faceted disease and the effect of specific exercise protocols on the different components of MetS has not been investigated. We will attempt to design an effective exercise programme to optimize patient exercise responses and improve metabolic characteristics in individuals with MetS. Load level is a critical principle of physical training in exercise. One method of determining load level is to measure the lactate threshold. The blood lactate transition threshold (BLTT), referred to as the anaerobic threshold (AT), will be used to set our exercise load. We will assume that the optimal level of overload in our exercising patients occurs at the AT. As a prelude to our experiment, the aim of the current study is (a) to investigate the reproducibility of lactate measurements and the determination of AT via the Mader and ADAPT methods in patients with MetS; and (b) to describe the BLTT of patients with MetS. Ten patients diagnosed with MetS and twelve healthy subjects each performed BLTT measurements at the same time on three different days. One day's rest was allowed between each measurement. Peak oxygen consumption was also determined during the tests. Statistical analysis will calculate coefficients of variation between testing sessions for the experimental group and for the control group. The average values of the two groups will be compared using the independent t statistic. Results will be discussed.

SELF-REPORTED INCIDENCE OF INJURIES AMONG LATIN-AMERICAN AND BALLROOM DANCERS

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Background. Although Latin-American and ballroom dancing is one of the fastest growing sports in South Africa, very little is known about the nature and severity of injuries of these dancers, evident by the lack of research literature available on this form of dancing, although other forms of dancing (ballet and modern) have been well researched.

Aim and method. The aim of this study was to: 1) quantify the incidence of injuries; 2) identify the nature of injuries; and 3) identify potential aetiological risk factors of injury retrospectively by means of questionnaires at the 2003 and 2004 South African National Dance Sport championships.

Results. The overall incidence of injury for 2003 and (2004) was 1.5 per 1 000 and (0.99 per 1 000) dance hours, with females being injured significantly ($p<0.001$) more. Acute injuries occurred more frequently in males (76.9 and (80.0) %) and chronic injuries occurred more frequently in females (58.8 (54.0) %). Overall the most frequently injured anatomical sites in 2003 were the back and neck (35%) followed by ankle, foot and toes (29%), while in 2004 ankle, foot and toe (39.5%), followed by back and neck (23.3%) were injured most often. Muscle pulls (36.8%) were the most common type of injury followed by blisters (23.7%) and bruises (13.2%).

Conclusion. Dancers need to be made aware of when to seek medical advice and should supplement their dance training with core stability strengthening to improve performance and reduce the risk of injuries.

PHYSIOLOGICAL ADAPTATIONS IN UNTRAINED AFRICAN AND CAUCASIAN MALES, FOLLOWING ECCENTRICALLY INDUCED MUSCLE DAMAGE

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Background. Eccentrically biased exercise (downhill running (DHR)) elicits muscle trauma. A potential adaptation may be an increase in stiffness of the muscular-tendon system (MTS), possibly enhancing elastic recoil potential of the muscle. This response may facilitate a decrease in running economy (RE), and facilitate changes in associated metabolic variables. Anecdotal evidence suggests that Africans and Caucasians may respond differently to exercise-induced muscle damage.

Aim. To determine differences in physiological variables before and after a bout of DHR in untrained African (n=10) and Caucasian (n=9) males.

Methods. RE (ml/kg/min), lactate (mmol/l), respiratory exchange ratio (RER), and heart rate (HR) (bpm) were measured at 2 steady state speeds before and at 2, 4, and 6 weeks after DHR (-13.5%, 60 minutes). Data were analysed using a repeated measures ANOVA (2x4), $p<0.05$.

Results. There was a significant group effect after DHR, with RE, lactate, and RER being lower for Africans, while HR was lower for Caucasians. There was also a significant time effect: lactate, RER, and HR being lower for both groups, compared with baseline.

Conclusion. Africans may adapt differently to DHR compared with Caucasians. It is tenable that the reduced metabolic cost of running seen in Africans may be related to 'healing' and a concomitant increase in elastic recoil energy in MTS. Further more one bout of exercise-induced muscle damage resulted in a positive adaptation in a variety of related physiological variables.

EAT SMART FOR SPORT. A PRACTICAL GUIDE TO SPORTS NUTRITION.

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Well-renowned scientific information on the nutritional requirements for athletes exists. This information provides athletes with the theoretical knowledge that they aspire to. However, a problem facing many dieticians and athletes is that current carbohydrate recommendations are often difficult for athletes to consume in practical terms and are too vague for the average athlete to translate into daily food consumption. Eat Smart for Sport provides gender, weight, age and exercise duration specific tables with specific daily carbohydrate, protein and fat recommendations. Carbohydrate, protein and fat UNITS were calculated from daily energy expenditure values. The energy allocated to carbohydrate, protein and fat was 60, 15 and 25 per cent respectively. The energy expenditure values for a rest day, reflected in this book, are in line with a sedentary indirect calorimeter protocol. The rest-day value was then increased in a step-wise fashion for 1, 2 and 3 hours of daily exercise. Many examples of common sports drinks and foods that are suitable for before, during and after exercise are listed, according to the glycaemic index (GI) and glycaemic load (GL) value. Detailed information on carbo-loading, training and competition nutrition is also provided, as well as information on fluids, vitamins, minerals and essential fatty acids. Eat Smart for Sport provides a valuable tool for dieticians and athletes to consume a practical but effective number of carbohydrate, protein and fat UNITS per day, depending on the training programme and whether or not the athlete wants to lose weight.

INJURIES SUSTAINED BY FEMALE INFANTRY TRAINEES DURING BASIC TRAINING: JANUARY - APRIL 2005

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Infantry trainees reported approximately 50 exercise-related injuries as well as a larger-than-expected number of shin-splint injuries over a 12-week period, during basic training. Of these 13 female infantry trainees, each of them having sustained a least one pubic stress fracture, sustained a total of 18 stress fractures. An attempt was made to understand the causative factors and the mechanisms by which they interact in order to prevent such injuries in the future. Both extrinsic and intrinsic factors were investigated. The potential extrinsic risk factors that were investigated included the training block programme and the physical training programme. The block-training programme shows that intense training was carried out from 08:00 to 16:25 for a period of 12 weeks and that the majority of the 56 periods of drill occurred in the first four weeks of training. Three physical training (PT) periods of 40 minutes were conducted weekly as well as one period weekly at the swimming pool. Additionally mixed training of male and female recruits took place where the female infantry trainee is thus forced to increase her stride length during drill. The potential intrinsic factors were also investigated. Of these the body composition, muscle strength and skeletal alignment were of concern. The female infantry trainees had a mean %BF of 31.1% as well as a mean waist/hip ratio (0.77) that was lower than the age-related mean (0.86). Both the mean quadriceps muscle strength (175n/m - right and 166n/m - left) and the mean hamstring muscle strength (112n/m - right and 109n/m - left) were below the gender-related norm (230n/m - quadriceps and 130n/m - hamstrings). In both limbs the Q-angle of the female infantry trainees (Q= 19.92° - right and 17.54° - left) was found to be greater than the acceptable norm (q= 15°). It is clear that four clear interventions should be revisited: the mixed training of male and female recruits; ensure that short recruits are placed in the front part of the squad during drill; ensure that a scientifically based PT training programme is followed, and ensure a pre-selection in which potential intrinsic risk factors are assessed.

FREE LIVING ENERGY EXPENDITURE IN A COHORT OF OFFICE EMPLOYEES

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Objective. To accurately measure the daily energy expenditure in employees previously identified as having ≥2 risk factors for chronic disease, and to identify potential risk-reducing interventions.

Design. 122 employees with ≥2 risk factors for chronic disease identified in an in-house screening programme were invited to participate in a 6- month health management programme. Physical assessments included anthropometric measurements, blood pressure, blood glucose and cholesterol estimations, and bicycle ergometry. All were invited to wear a 'metabolic armband' (Body Media SenseWear Pro Armband®) for 6 days. Metabolic measures included active and total energy expenditure (AEE, TEE), and daily MET levels (metabolic equivalents expressed as kcal/kg/hour). Differences were explored between genders, and relationships sought between energy expenditure, lifestyle and anthropometric data.

Setting. A corporate working environment. All measures and assessments were carried out in the in-house fitness facility.

Interventions. The study sought to identify potential interventions for future study.

Main outcome measures. TEE per day, duration and quantification of physical activity, METS, AEE, number of steps per day and body position recording. Relationships were explored between the latter and anthropometric measures such as body mass index (BMI) and percentage body fat.

Results. 53 of the eligible subjects volunteered for the 6-month programme and 49 enrolled for the metabolic armband study. Men were more active than the women but both had BMI and body fat estimates that categorised them as overweight to obese. METS and AEE were positively correlated with duration of exercise rather than intensity, and negatively correlated with BMI. In a stepwise regression analysis for the total group, 77% of the variance in MET levels was accounted for by per cent body fat and steps per day. Analysis by gender suggested that in order to reduce body fat, males would have to increase the duration of vigorous exercise, while females would benefit from sitting less, sleeping more, and increasing the duration of moderate exercise.

Conclusion and clinical relevance. Men and women differed in the parameters measured. Based on the results there is possibly a weight reduction intervention for women that would focus on sitting less, sleeping more, and walking a little more each day.