VISTA2011 Scientific Conference Booklet

Gustav-Stresemann-Institut
Bonn, 31 August – 3 September 2011

"A Multidisciplinary Approach to Paralympic Success"

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VISTA2011 Scientific Conference
Gustav-Stresemann-Institut
Bonn, 31 August – 3 September 2011

The VISTA2011 Conference is organized by:

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VISTA2011 Scientific Conference
Table of Contents

Sir Philip Craven, MBE
IPC President

Dear Participants,

On behalf of the International Paralympic Committee (IPC), I would like to welcome you to the 2011 edition of VISTA, the scientific conference organized by the IPC. This conference brings together sports scientists, sports administrators, coaches and athletes in Paralympic sports from around the world.

The IPC Sports Science Committee has put together an ambitious programme for the next days packed with keynote speeches, symposia, free communications and poster sessions, which will not only give you an overview of what is going on in the scientific community and within the IPC Membership but will also inspire you in your ongoing work. I would like to thank all presenters for their engagement to our Movement and their willingness to share their findings, including those identified by the Membership as priority themes on the Movement's agenda over the next four years: organizational development in the Paralympic Movement, classification and Paralympic Identity. But I certainly invite you to get yourself informed as well on recent developments in talent identification, sports injuries, sports counseling, and the role of Paralympic sports in social legacy, awareness and community changes.

For the first time, the Paralympic Scientific Award will be awarded on the occasion of VISTA, and I hereby congratulate Prof. Lucas van der Woude from the State University of Groningen, The Netherlands, as the 2011 recipient of the Award.

The Gustav-Stresemann-Institut (GSI), the Haus der Geschichte and the unique location for the Closing Banquet will certainly facilitate what VISTA ultimately stands for: a unique opportunity to engage in critical reflection and social debate on all these themes amongst experts, colleagues and friends.

I would also like to thank the city of Bonn for their generous grant from the European Funds for Regional Development (EFRE).

I hope you all enjoy VISTA2011 and take home many new, interesting and inspiring insights into the Paralympic scientific world.

Philip Craven

Sir Philip Craven, MBE
President, International Paralympic Committee

Jürgen Nimptsch,
Lord Mayor of the City of Bonn

The VISTA Conference, organized by the International Paralympic Committee (IPC), will take place from 31 August to 3 September 2011 and will again unite experts for Paralympic Sport from all over the world in Bonn. As former head of a school which placed particular emphasis on jointly teaching students with and without a disability and as a teacher for Sports and German, I am touched by the Paralympic idea in a special way. Therefore it is my great pleasure to warmly welcome you to the VISTA Conference in Bonn.

The International Paralympic Committee has had its headquarters in Bonn since September of 1999 and has successfully been building a bridge between Bonn's profile as an International City and Bonn as a City of Sports. In the course of public events throughout the year, such as the Paralympic Day, the Paralympic School Day, and United Nations Day, as well as throughout a very vivid annual partnership between the IPC and the City of Bonn the Committee has enthused many of our citizens about Paralympic Sport. The citizens of Bonn take pride in the fact that the Winter and Summer Games for Paralympic athletes are organized from here. It is our big wish that, some day, the name of Bonn may be linked to the Paralympic idea as closely as Lausanne's name is linked to the International Olympic Committee.

I am delighted that the VISTA Conference will be held in Bonn for the second time after being hosted here in 2006 and I wish all participants a successful outcome of this meeting. May it be a further step down the road to the Paralympic City of Bonn.

Jürgen Nimptsch
Lord Mayor of the City of Bonn

Prof. Yves Vanlandewijck, Chairperson IPC Sports Science Committee

Dear Participants,

On behalf of the IPC Sports Science Committee, I am delighted to welcome you in Bonn as a participant of the VISTA2011 Conference.

The Sports Science Committee of the International Paralympic Committee (IPCSSC) aims to enhance the knowledge about Paralympic Sport by intensifying co-operation and communication among athletes, coaches and sport administrators on one side, and medical personnel and researchers on the other. The Committee's tasks include a needs assessment and the development, evaluation, dissemination and application of a body of knowledge about Paralympic Sport. Focus lies on key issues like sport performance (including physiology, sports medicine and training techniques), classification, ethics, integration development and recruitment. Also, organization and administration as well as media, marketing and sponsoring are important topics.

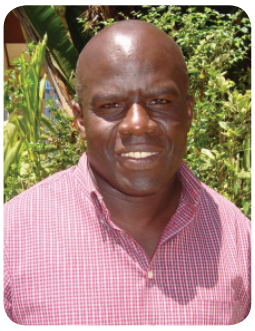
The objective of the VISTA2011 Conference is to have a number of these topics discussed by a balanced field of invited experts and contributions from a number of recognized experts from the field during the free communication and poster sessions. Following the successful examples of previous VISTA Conferences, we set the stage for a highly effective and fruitful dialogue between scientists, coaches, athletes and administrators on key issues of competitive sport for persons with a disability.

Many thanks go to our partners and all contributing authors for their support and involvement in the Conference. I look forward to your contribution to an interesting programme and I am convinced that this Conference will be an ideal platform for the thorough and constructive exchange of views in order to bridge the gap between theory and practice and to encourage interdisciplinary discussion.

Prof. Yves Vanlandewijck
Chairperson, IPC Sports Science Committee

The VISTA2011 Scientific Committee

Prof. Yves Vanlandewijck (BEL)
IPC Sports Science Committee
Chairperson



Mr. Peter W. Bukhala (KEN)
IPC Sports Science Committee
Member

Dr. Brendan Burkett (AUS)
IPC Sports Science Committee
Member

Ms. Osnat Fliess-Douer (ISR)
IPC Sports Science Committee
Member

Dr. Jennifer Mactavish (CAN)
IPC Sports Science Committee
Member

Dr. Walter Thompson (USA)
IPC Sports Science Committee
Member

Dr. Sean Tweedy (AUS)
IPC Sports Science Committee
Ex-officio Member

Mr. Ernst van Dyk (RSA)
IPC Sports Science Committee
Member

Dr. Pia Pit-Grosheide (NED)
IPC Scientific Studies Co-ordinator

Dr. Peter Van de Vliet (BEL)
IPC Medical & Scientific Director

VISTA2011 Scientific Conference
Venue

GSI – Gustav-Stresemann-Institut e.V.
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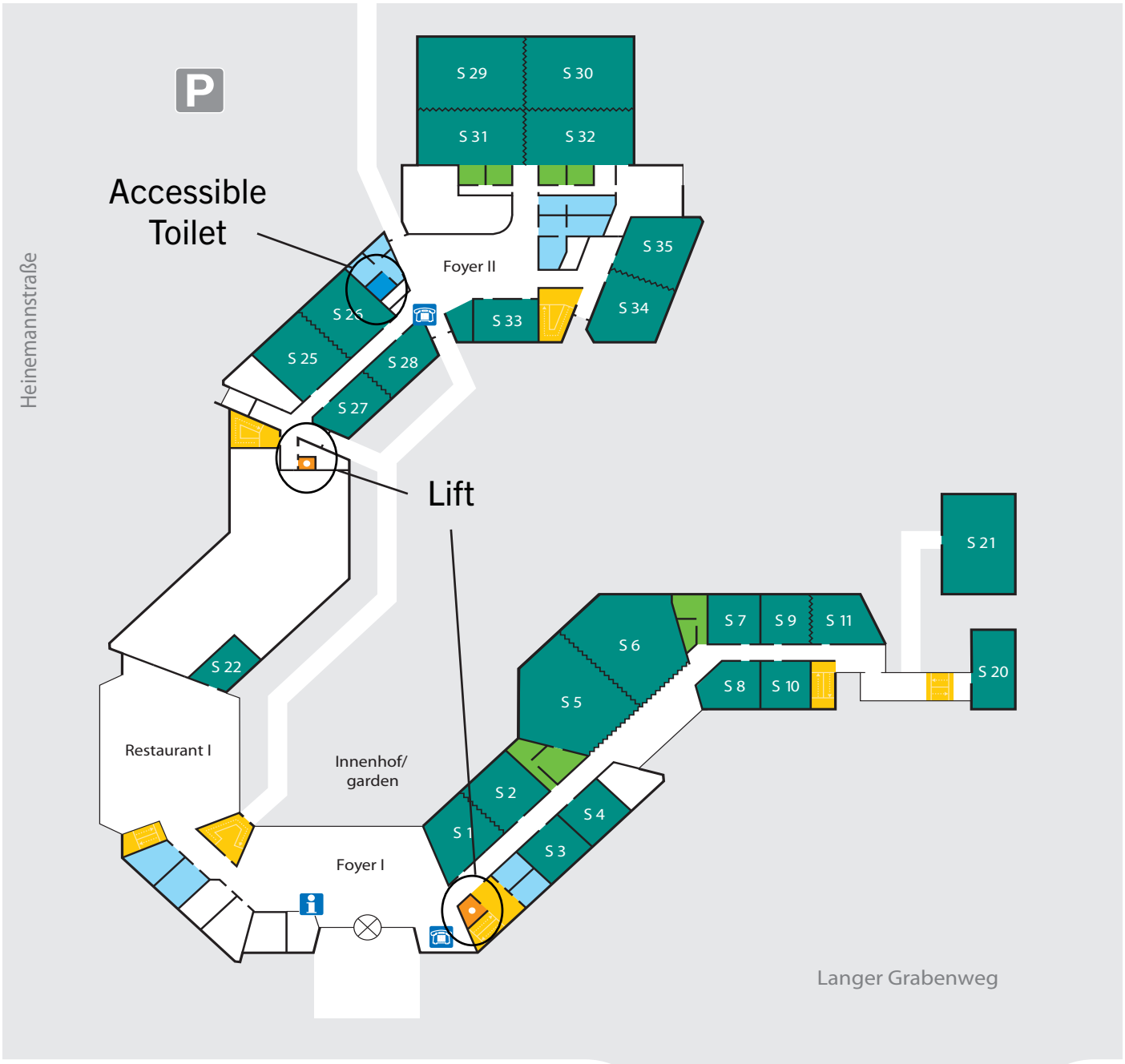
VISTA2011 Scientific Conference Venue



Erdgeschoss

ground level

VISTA2011 Scientific Conference
Programme at a Glance

	Wednesday 31 August 2011	Thursday 1 September 2011	
9:00-10:00		Keynote Lecture, Liz Nicholl, OBE **Organizational Development in Paralympic Sport** *VISTA Room 1*	
Coffee Break			
10:30-12:10		Invited Symposium **Social Legacy of Disability Sport** *VISTA Room 1*	Free Communications **Classification** *VISTA Room 2*
Lunch Break			
13:40-14:40		Free Communications **Health Related Quality of Life** *VISTA Room 1*	Free Communications **Exercise Physiology in Wheelchair Sports** *VISTA Room 2*
Coffee Break			
15:00-16:20	**Conference Registration** *GSI - Welcome Desk*	Free Communications **Humanities** *VISTA Room 1*	Free Communications **Body Composition** *VISTA Room 2*
Coffee Break			
16:40-18:20		Invited Symposium **Are the Paralympic Games becoming the Games for the 'Minimally Disabled'?** *VISTA Room 1*	Free Communications **Organizational Development** *VISTA Room 2*
	18:00-20:00 **Opening Ceremony** *'Haus der Geschichte'*		

VISTA2011 Scientific Conference
Programme at a Glance

Friday 2 September 2011			Saturday 3 September 2011		
Keynote Lecture, Prof. Yves Vanlandewijck **Evidence Based Classification in Paralympic Sport** *VISTA Room 1*			Keynote Lecture, Prof. Mike McNamee **Challenges and Opportunities for the Paralympic Movement: Ethical and Conceptual Issues** *VISTA Room 1*		
Invited Symposium **The Travelling Athlete** *VISTA Room 1*		Free Communications **Biomechanics and Technological Development** *VISTA Room 2*	Invited Symposium **The Structure of Sports within the Movement** *VISTA Room 1*		Free Communications **Assessment and Coaching** *VISTA Room 2*
Free Communications **Health Related Quality of Life** *VISTA Room 1*	**Poster Session** *VISTA Foyer*	Free Communications **Networking and Policy** *VISTA Room 2*	Free Communications **Classification** *VISTA Room 1*		Free Communications **Talent Development** *VISTA Room 2*
Free Communications **Classification** *VISTA Room 1*		Free Communications **Miscellaneous** *VISTA Room 2*	Free Communications **Sports Injury and Medical Care** *VISTA Room 1*		Free Communications **Classification** *VISTA Room 2*
Invited Symposium **Performance Enhancing Agents – When are you Crossing the Line?** *VISTA Room 1*		Free Communications **Barriers and Equity** *VISTA Room 2*	Invited Symposium **Paralympic Sports' Research Findings Application - Linking the Laboratory and the Field** *VISTA Room 1*		Free Communications **Biomechanics and Technological Development** *VISTA Room 2*
			19:30-22:30 **Closing Banquet** with Paralympic Scientific Award Gala *'Poseidon Rhine Cruise'*		

VISTA2011 Scientific Conference
Detailed Programme

WEDNESDAY 31 AUGUST 2011

12:00-22:00
GSI Welcome Desk

Conference Registration

18:00-20:00
Haus der Geschichte

Opening Ceremony
(Bus transfers will be available from the GSI from 17:30)

THURSDAY 1 SEPTEMBER 2011

9:00-10:00
VISTA Room 1

Organizational Development in Paralympic Sport

Keynote Lecture, Liz Nicholl (CEO UK Sport)

10:00-10:30 *Coffee Break*

10:30-12:10 SESSION A - INVITED SYMPOSIUM 1

VISTA Room 1

Social Legacy of Disability Sport

Moderator: Jennifer Mactavish (Faculty of Kinesiology and Recreation Management University of Manitoba, Winnipeg, Canada; Member IPC Sports Science Committee)

Panel Members:

Willi Lemke (Special Adviser to the United Nations Secretary-General on Sport for Development and Peace).

Rosa López de D'Amico (Universidad Pedadógica Experimental Libertador (UPEL) – Maracay, Venezuela; Chairperson International Committee of Sport Pedagogy): The Paralympic Movement to Lever Education and Awareness to Individuals with a Disability: Academic Perspectives Translated into Governance.

Tracey Dickson (Faculty of Business and Government, University of Canberra, Australia): A volunteer Legacy: the Rhetoric, the Reality and Some Recommendations.

10:30-12:10 SESSION B - FREE COMMUNICATIONS I

VISTA Room 2

Classification

Moderator: Yves Vanlandewijck (Faculty of Kinesiology and Rehabilitation Sciences Catholic University of Leuven, Belgium; Chairperson IPC Sports Science Committee)

10:30 Proposals for the Development of a New Way for Classification of Visually Impaired Athletes, Computer-Based with the Aid of LCD Goggles: **C. Garletti; E. Garletti (#41)**

10:50 Development of Table Tennis Specific Classification System for Players with Intellectual Disabilities: **S. K. Wu; G. Vecko; N. Verspeelt; Y. Vanlandewijck; D. Van Biesen; J. Stefak; A. Burchell (#1)**

11:10 Reliability of the Revised Trunk Classification System for Wheelchair Rugby: **V.C. Altmann, B. E. Groen; N. L. W. Keijsers; A. L. Hart; J. Van Limbeek; Y. Vanlandewijck (#12)**

11:30	Energy Expenditure and Physiological Responses between Classification Groups in Wheelchair Basketball: **L. E. Croft; K. Tolfrey; V. L. Goosey-Tolfrey (#18)**
11:50	Evaluation of a Novel Strength Test Battery for Use in Classification in Paralympic Athletics: Reliability, Normal Performance and Relationship to Body Size: **E. M. Beckman; P. Newcombe; Y. Vanlandewijck; M. Connick; S. M. Tweedy (#58)**
12:10-13:40	*Lunch Break*

13:40-14:40 SESSION A – FREE COMMUNICATIONS II

VISTA Room 1

Health Related Quality of Life

Moderator: Osnat Fliess-Douer (Wingate College, Israel; School of Education Bar – Ilan University, Israel; Member IPC Sports Science Committee)

13:40	A Stakeholder Evaluation of Evidence-Informed Physical Activity Guidelines for Adults with Spinal Cord Injury: **A. E. Latimer; K. A. Martin Ginis; A. L. Hicks (#44)**
14:00	Psychological Distress Profiles of Elite Athletes with Disabilities; Clinical Use of the Kessler Psychological Distress Scale (K10): **S. Ferreira; W. Derman (#52)**
14:20	Patterns of Long-Term Sport Participation after a Spinal Cord Injury (SCI): **M. J. Perrier; A. E. Latimer; K. A. Martin Ginis; Shape-SCI Research Team (#42)**

13:40-14:40 SESSION B – FREE COMMUNICATIONS III

VISTA Room 2

Exercise Physiology In Wheelchair Sports

Moderator: Sean Tweedy (School of Human Movement Studies, University of Queensland, Brisbane, Australia; Member IPC Classification / Sports Science Committee)

13:40	Submaximal Exercise Responses in Tetraplegic, Paraplegic and Non Spinal Cord Injured Elite Wheelchair Athletes: **C. A. Leicht; N. C. Bishop; V. L. Goosey-Tolfrey (#15)**
14:00	Wheelchair Tennis Match Play Demands: The Effects of Playing Experience and Player Ranking: **P. Sindall; J. P. Lenton; K. Tolfrey; V. L. Goosey-Tolfrey (#22)**
14:20	A Comparison of Peak Physiological Responses during Handcycling and Arm Crank Ergometry: **P. M. Smith; H. Buchanan; M. J. Price (#21)**
14:40-15:00	*Coffee Break*

15:00-16:20 SESSION A – FREE COMMUNICATIONS IV

VISTA Room1

Humanities

Moderator: Peter Bukhala (Kenyatta University, Nairobi, Kenya; Member IPC Sports Science Committee)

15:00	'Who's in and Who is Out?' - The Percieved Legitimacy of Including Certain Bodies within the Paralympic Games: **D. Purdue; P. D. Howe (#10)**
15:20	A Movement Returning to its Roots: Paralympic – Military Links in the Twenty-First Century: **I. Brittain (#17)**
15:40	Inside, Outside, Nowhere is Home: Ethics, Ethnography and the Paralympic Movement: **P. D. Howe (#27)**

16:00 Examining the IPC-IOC Relationship in Theory and Practice: **E. Wolff; D. Legg, M. Hums; I. Brittain; T. Fay (#31)**

15:00-16:20 SESSION B – FREE COMMUNICATIONS V

VISTA Room 2 **Body Composition**

Moderator: Walter Thompson (College of Education & College of Health and Human Sciences, Georgia State University, Atlanta, Member IPC Sports Science Committee)

15:00 Applicability of Body Fat Prediction Equations in Athletes with Spinal Cord Injury: **J. I. Gorla; N. M. Pereira; A. A. Costa E Silva; C. D. Ramos; A. O. Santos; R. N. Cabrera; D. R. Calegari; L. F. C. C. Campos; M. P. Magno E. Silva (#38)**

15:20 Body Fat Reduction in an Athlete with Cerebral Palsy – A Case Study: **E Broad (#54)**

15:40 Assessment of the Anthropometric and Motor Variables of the Brazilian Blind Soccer Elite Athletes: **L. F. C. C. Campos; A. A. Costa E Silva; P. C. Yamagute; R. P. Souza; J. I. Gorla (#65)**

16:00 Evaluation of the Relation between Anthropometric and Fat Percentage in Athletes with Spinal Cord Injury: **J. I. Gorla; A. A. Costa E Silva; N. M. Pereira; C. D. Ramos; A. O. Santos; R. N. Cabrera; L. F. C. C. Campos; D. R. Calegari; M. P. Magno E. Silva (#39)**

16:20-16:40 *Coffee Break*

16:40-18:20 SESSION A – INVITED SYMPOSIUM 2

VISTA Room 1 **Are the Paralympic Games Becoming the Games for the "Minimally Disabled"?**

Moderator: Yves Vanlandewijck (Faculty of Kinesiology and Rehabilitation Sciences Catholic University of Leuven, Belgium; Chairperson IPC Sports Science Committee)

Panel Members:

Verena Bentele (IPC Nordic Skiing Athlete): Are Performances of Athletes with High Support Needs Really Elite? Challenges and Opportunities in Marketing Performances of Athletes with High Support Needs.

Sean Tweedy (School of Human Movement Studies, University of Queensland, Brisbane, Australia; Member IPC Classification / Sports Science Committee): Should the Paralympic Games Become the Games of the 'Minimal Disabled'? Issues of Leadership, Philosophy and Governance for The Movement.

16:40-18:20 SESSION B – FREE COMMUNICATIONS VI

VISTA Room 2 **Organizational Development**

Moderator: Jennifer Mactavish (Faculty of Kinesiology and Recreation Management University of Manitoba, Winnipeg, Canada; Member IPC Sports Science Committee)

16:40 Sport for Development: The Case of Paralympic Sports in the East African Region: **P. Bukhala (#82)**

17:00 A Proposed Model for Grassroots Paralympic Sport Development: **A. Forber-Pratt; J. Scott; J. Driscoll; M. Siebel (#66)**

17:20 The Paralympic Sport and the Evolution in Brazil in the Last Four Paralympics Games: Atlanta - Pequim: **A. M. Da Costa; P. S. De Freitas; A. M. Da Costa Filho; M. H. Candelori (#33)**

17:40 Cross-Cultural Differences in Volunteer Motivation at Disability Sports Events: A Comparative Study of Malaysia and USA: **S. Khoo; R. Engelhorn (#62)**

18:00 Integration of Wheelchair Tennis into the International Tennis Federation (ITF): **M. Bullock (#6)**

FRIDAY 2 SEPTEMBER 2011

9:00-10:00 VISTA Room 1

Evidence Based Classification In Paralympic Sport

Keynote Lecture: Yves Vanlandewijck (Faculty of Kinesiology and Rehabilitation Sciences: Catholic University of Leuven, Belgium; Chairperson IPC Sports Science Committee)

10:00-10:30 *Coffee Break*

10:30-12:10 SESSION A - INVITED SYMPOSIUM 1

VISTA Room 1

The Travelling Athlete

Moderator: Walter Thompson (College of Education & College of Health and Human Sciences, Georgia State University, Atlanta, Member IPC Sports Science Committee)

Panel Members:

Cheri Blauwet (Department of Physical Medicine and Rehabilitation Harvard Medical School Spaulding Rehabilitation Hospital; Member IPC Medical Committee).

Nick Webborn (The Sussex Centre for Sport and Exercise Medicine, UK; Medical Officer Team GB London 2012).

Wayne Derman (MRC/UCT Research Unit for Sports Science & Sports Medicine & IOC Research Unit for Injury Prevention and Protection of Health of the Athlete).

10:30-12:10 SESSION B – FREE COMMUNICATIONS I

VISTA Room 2

Biomechanics and Technological Development

Moderator: Yves Vanlandewijck (Faculty of Kinesiology and Rehabilitation Sciences Catholic University of Leuven, Belgium; Chairperson IPC Sports Science Committee)

10:30 Technical Development af a Multi-Axis Ankle Prosthetic Component as an Aid for the Lower Leg Amputee Equestrian Paralympics' Rider to Achieve Optimum Balance and Alignment: **D. Lyle (#4)**

10:50 The Role of Rear-Wheel Camber on Optimal Mobility Performance in Wheelchair Athletes: **B. S. Mason; L. H. V. van der Woude; K. Tolfrey; V. L. Goosey-Tolfrey (#24)**

11:10 Application of a Power Measurement Tool (the 'Powerwheel') in Wheelchair Racing: **R. I. G. Thompson; T. C. D. Grey-Thompson (#40)**

11:30 Differences in Electromechanical Delay between Cerebral Palsy Boccia Athletes: **R. Reina; R. Sabido; D. Barbado (#64)**

11:50 Lower Trunk Muscle Activity during Front Crawl Swimming in a Single Leg Amputee: **I. Einarsson; J. Martens; N. Schnizer; F. Staes; D. Daly (#75)**

12:10-13:40 *Lunch Break*

13:40-14:40 SESSION A – FREE COMMUNICATIONS II

VISTA Room 1

Health Related Quality of Life

Moderator: Jennifer Mactavish (Faculty of Kinesiology and Recreation Management University Of Manitoba, Winnipeg, Canada; Member IPC Sports Science Committee)

13:40 Evaluation of Wellbeing and Hydration in Paralympic Athletes Preparing for The Games: Beijing 2008: **H. Alfano; N. Diaper; J. Crosland; V. Goosey-Tolfrey (#36)**

14:00 Sleep Quality Evaluation, Chronotype, Sleepiness and Anxiety of Paralympic Brazilian Athletes: Beijing 2008 Paralympic Games: **M.T. De Mello; A. Silva; S. Queiroz; C. Winckler; R. Vital; R. Peterson; S. Tufik (#49)**

14:20 High Exercise Loads Depress Salivary Immunoglobulin A in Elite Tetraplegic Athletes: **C. A. Leicht; N. C. Bishop; T. Paulson; K. E. Griggs; V. L. Goosey-Tolfrey (#16)**

13:30-17:00 SESSION B – POSTER SESSION

VISTA Foyer

Technical Development of an Ankle Prosthetic Component as an Aid for the Lower Leg Amputee Triathlete during the Transition to and from the Swimming Event.: **D. Lyle (#3)**

Survey of Types of Disability and Functional Classification of Athletics in Brazil: **P. S. De Freitas; R. C. Montelli; S. S. Santos; J. P. C. Souza; A. M. Da Costa (#34)**

Evidence-Informed Physical Activity Guidelines for Individuals with Spinal Cord Injury: Implications for Practice and for Other Mobility Impairment Groups: **K. A. M. Ginis; A. L. Hicks; A. E. Latimer; D. Warburton; C. Bourne; D. Ditor; D. Goodwin; K. C. Hayes; N. McCartney; A. McIlraith; P. Pomerleau; K. Smith; J. A. Stone; D. Wolfe (#43)**

Management of Expanding Sport of the Disabled in the World: **G. Ebrahimi (#51)**

Cardiovascular Responses of Wheelchair Dancers during Dance. Part 1: **K. Terada; A. Satonaka; Y. Terada; N. Suzuki (#55)**

Strategies for Raising Awareness about Paralympic Sport: The Positive Impact of Multidiscipline Approaches to Research and Information Sharing: **J. Le Clair (#57)**

Comparison of Depression between Two Groups of Amputees: Amputees Athletes and Amputees without Sport Activities and Role of Paralympic Movement on the Mental Health of Peoples with Disability: **B. Zand (#70)**

Survey of Exceptional Student Perception (Visual Impairment or Physical Disabilities) Regarding to Paralympic Movement Underline Iran – NPC Activities: **B. Zand; Z. Yousefi (#71)**

"Kepruk Banyu" Indonesian Traditional Games as Efforts in Approach to Adapted Physical Activity in the Inclusive School: **S. Sumartiningsih (#77)**

The Effect of Breaststroke Swimming Exercise to Increase the Value of Peak Expiratory Flow (APE): **S. Sumartiningsih; A. Setiowati (#78)**

13:40-14:40 SESSION C – FREE COMMUNICATIONS III

VISTA Room 2

Networking and Policy

Moderator: Osnat Fliess-Douer (Wingate College, Israel; School of Education Bar – Ilan University, Israel; Member IPC Sports Science Committee)

13:40	Brazilian Paralympic Academy: **J. J. G. Almeida; J. I. Gorla; E. Duarte; P. S. Freitas; A. M. Costa; M. T. Melo; C. W. O. Filho; E. A. Rocha; R. Vital; A. Parsons; M. S. P. Gomes: (#35)**
14:00	European Disability Sport Policy: A Mapping Process Regarding Perspectives of Sport for People with a Disability in Europe: **M. Guett: (#63)**
14:20	Networks of Learning in Coaching Athletes with Disabilities: The Learning Experiences and Networks of Four Paralympic Coaches: **S. Taylor; P. Werthner; P. Trudel: (#69)**
14:40-15:00	*Coffee Break*

15:00-16:20 SESSION A – FREE COMMUNICATIONS IV

VISTA Room 1

Classification

Moderator: Sean Tweedy (School of Human Movement Studies, University of Queensland, Brisbane, Australia; Member IPC Classification / Sports Science Committee)

15:00	The Challenge of Revision of the Classification System of Wheelchair Dance Sport: **Y. A. Tsai; O. De Hulu; M. D. F. Van Eijsden-Besseling; D. Sharet (#80)**
15:20	Athletes Oriented Design of Sportspecific Classification Systems: **H. Strohkendl (#76)**
15:40	Validity of the Test-Table-Test for Nordic Skiing for Classification of Paralympics Sit-Ski Sports Participants: **D. H. F. M. Pernot; A. M. Lannem (#13)**
16:00	Improvement of the Classification System for Wheelchair Rugby: Athlete Priorities: **V. C. Altmann; A. L. Hart; J. Van Limbeek; Y. Vanlandewijck (#11)**

15:00-16:20 SESSION C – FREE COMMUNICATIONS V

VISTA Room 2

Miscellaneous

Moderator: Walter Thompson (College of Education & College of Health and Human Sciences, Georgia State University, Atlanta, Member IPC Sports Science Committee)

15:00	Spiroergometry (SE) on the Treadmill and Stress Test (ST) on the Bycicle Ergometer for Alpine Skiing Paralympics (ASP) Athletes: **N. A. C. Vinagre; A. Dillmann; T. Russomano; A. Niklas (#29)**
15:20	The Training of Psychological Skills Viewed by Elite Coaches – A Case Study in Boccia: **T. Bastos; R. Corredeira; M. Probst; A. M. Fonseca (#23)**
15:40	Applications of the Situational Leadership Model to Athletic Coaching: **A. Forber-Pratt (#67)**
16:00	The Relationship between Parameters of Maximal Excercise Capacity and Individual Time Trial Performance in Cyclists with Physical Disabilities: **P. Boer; E. Terblanche (#84)**
16:20-16:40	*Coffee Break*

16:40-18:20	SESSION A - INVITED SYMPOSIUM 2

VISTA Room 2

Performance Enhancing Agents – When are You Crossing the Line?

Moderator: Peter Van de Vliet (IPC Medical & Scientific Director)

Panel Members:

Fabio Pigozzi (University of Rome "Foro Italico", Rome, Italy; President International Federation of Sports Medicine (FIMS)): Supplements or Good Diets?

Matthias Struppler (Schweizer Paraplegiker – Zentrum, Nottwil, Switzerland; Member IPC Anti-Doping Committee): The Role of Physicians in Paralympic Athlete's Drug and Supplement Use

Alain Vernec (World Anti-Doping Agency (WADA) Medical Director): WADA Perspective on Performance Enhancing Agents

16:40-18:20	SESSION C – FREE COMMUNICATIONS VI

VISTA Room 2

Barriers And Equity

Moderator: Peter Bukhala (Kenyatta University, Nairobi, Kenya; Member IPC Sports Science Committee)

16:40 Barriers to and Facilitators of Exercise or Sport for Dutch Paralympic Athletes: **E. A. Jaarsma; J. H. B. Geertzen; P. U. Dijkstra; R. Dekker (#9)**

17:00 Wheelchair Basketball as a Medium for Removing Social Barriers across Ability and Nationality: **Y. Hutzler; I. Ben-Ezer (#26)**

17:20 Sport as a Tool for Improved Health and Social Empowerment in Women with Spinal Cord Injury - Overcoming Double Discrimination: **C. Blauwet; D. Popoli (#14)**

17:40 Football for Blind Women: **G. Mayr; F. Penello; R. Ceccon; A. Dias (#68)**

18:00 The Role of Women in the Achievements of 2010 Guangzhou Para Asian Games: **Sima Limoochi (#72)**

SATURDAY 3 SEPTEMBER 2011

9:00-10:00
VISTA Room 1

Challenges and Opportunities for the Paralympic Movement: Ethical and Conceptual Issues

Keynote Lecture: Mike McNamee (College of Human and Health Sciences Swansea University, Wales)

10:00-10:30 *Coffee Break*

10:30-12:10	SESSION A - INVITED SYMPOSIUM 1

VISTA Room 1

Structure of Sports within the Movement

Moderator: Peter Bukhala (Kenyatta University, Nairobi, Kenya; Member IPC Sports Science Committee)

Panel Members:

Gudrun Doll-Tepper (Fachbereich Erziehungswissenschaft und Psychologie, Freie Universität Berlin, Germany): Paralympic Movement: How Far Have We Come?

Xavier Gonzalez (IPC Chief Executive Officer): Future of Paralympic Sports in a Fast Changing Environment of Increased Professionalism.

Sarah Springman (Institut für Geotechnik, Eidgenössische Technische Hochschule Zürich, Switzerland; Vice President International Triathlon Union): The Inclusion of Par-Divisions in Olympic Sport Federations: Opportunities and Challenges.

10:30-12:10 SESSION B – FREE COMMUNICATIONS I

VISTA Room 2

Assessment and Coaching

Moderator: Sean Tweedy (School of Human Movement Studies, University of Queensland, Brisbane, Australia; Member IPC Classification / Sports Science Committee)

10:30 Evaluating Performance Progression in Wheelchair Rugby: **J. Berzen; Y. Hutzler (#25)**

10:50 The Testing and Training of Physical Performance Factors for Wheelchair Tennis Players: **H. Guentzel, T. Ami, H. Takahashi (#30)**

11:10 Isokinetics Evaluation of the Knee in Paralympics Athletes: Athletics Modality: **A. Silva; C. Winckler; R. Peterson; R. Itiro; R. Vital; G. Leite; I. Taiar; S. Mattiello; S. Tufik; M. T. De Mello (#32)**

11:30 Development of a Field Test for Measuring Aerobic Capacity in Paralympic Goalball Athletes: **L. A. Malone; D. Gulick; I. Nyikos; J. D. Brasher (#46)**

11:50 Developing a Match Analysis and Feedback System to Paralympic Table Tennis: **M. Häyrinen; M. Blomqvist; J. Peltovako (#47)**

12:10-13:40 *Lunch Break*

13:40-14:40 SESSION A – FREE COMMUNICATIONS II

VISTA Room 1

Classification

Moderator: Jennifer Mactavish (Faculty of Kinesiology and Recreation Management University of Manitoba, Winnipeg, Canada; Member IPC Sports Science Committee)

13:40 Eligibility and Classification of Athletes with Intellectual Disabilities: **D. Van Biesen; J. Burns; D. Daly; K. Frojd; M. Gregg; J. Mactavish; W. Potthast; M. Geeraerts; Y. Vanlandewijck (#45)**

14:00 Challenges Moving Towards Sport Specific Classification for Athletes with a Visual Impairment. Analysis of the Actual Situation and Model Forward: **B. Bittner; N. O'Donovan; P. Van De Vliet; L. De Salvia (#81)**

14:20 A Functional Approach to Classifying Athletes with Severe Levels of Impairment for Powerchair Team Sports: **S. Evans (#79)**

13:40-14:40 SESSION B – FREE COMMUNICATIONS III

VISTA Room 2

Talent Development

Moderator: Osnat Fliess-Douer (Wingate College, Israel; School of Education Bar – Ilan University, Israel; Member IPC Sports Science Committee)

13:40 Investigation into the Support Requirements of School Aged (11-18 Years) Gifted and Talented Performers in Disability Sport: **T. Blowers; J. Crosland; J. Katz; V. Goosey-Tolfrey (#5)**

14:00 Talent Identification and Development (TID) Programmes of Paralympic Athletes in the UK, USA and Canada – A Cross-National Comparison: **S. Radtke; G. Doll-Tepper (#8)**

14:20 The Science Support in Brazilian Athletics Permanent Team Program: **C. Winckler; A. Silva; R. Peterson; R. Itiro; R. Brandão; R. Vital; G. Leite; S. Tufik; M. T. De Mello (#61)**

14:40-15:00 *Coffee Break*

15:00-16:20 SESSION A – FREE COMMUNICATIONS IV

VISTA Room 1 **Sports Injury And Medical Care**

Moderator: Walter Thompson (College of Education & College of Health and Human Sciences, Georgia State University, Atlanta, Member IPC Sports Science Committee)

15:00 The Vancouver 2010 Paralympic Winter Games Medical Care Programme: Facts, Figures and Recommendations: **P. Van de Vliet; S. Willick; O. Martinez; M. Wilkinson; R. Stewart; T. Sasyniuk; R. Celebrini; P. Pit-Grosheide; J. Taunton (#74)**

15:20 Profile of Medical and Injury Consultations of Team South Africa (SA) during The Paralympic Games of Beijing 2008: **W. Derman; K. Subban (#53)**

15:40 Aerobic Fitness and Atherosclerotic Cardiovascular Risk in Paralympic Athletes with Locomotor Impairments: **M. Bernardi; S. Carucci; F. Egidi; F. Faiola; E. Guerra; D. Mandolesi; A. Spataro; C. Tranquilli; A. Biffi; A. Pelliccia (#83)**

16:00 The Paralympic Athlete – Are Injuries All in the Game?: **P. Pit-Grosheide; P. Van de Vliet (#73)**

15:00-16:20 SESSION B – FREE COMMUNICATIONS V

VISTA Room 2 **Classification**

Moderator: Yves Vanlandewijck (Faculty of Kinesiology and Rehabilitation Sciences Catholic University of Leuven, Belgium; Chairperson IPC Sports Science Committee)

15:00 Comparison of Trunk Sagittal Displacement Control in Sitting Position between Slalom Athletes with Cerebral Palsy and Controls: **S. Guzmán-Morales; R. Reina; J. L. L. Elvira; A. López-Valenciano; F. J. Vera-García (#60)**

15:20 Analysis of Table Tennis Performance and Functional Standing Classification System at the 2002 and 2010 World Championships: **S. K. Wu (#2)**

15:40 Influence of Trunk on Wheelchair Propulsion: Using Evidence to Guide Classification System Review: **L. Washington; A. Hart (#7)**

16:00 What is the Optimal Position for Seated Throwing in Paralympic Athletics?: **S. M. Tweedy; M. J. Connick; B. Burkett; M. Sayers; C. Meyer; Y. Vanlandewijck (#59)**

16:20-16:40 *Coffee Break*

16:40-18:20 SESSION A – INVITED SYMPOSIUM 2

VISTA Room 1 **Paralympic Sports' Research Findings Application – Linking the Laboratory and the Field**

Moderator: Osnat Fliess-Douer (Wingate College, Israel; School of Education Bar – Ilan University, Israel; Member IPC Sports Science Committee)

Panel Members:

Barry Mason (Peter Harrison Centre for Disability Sport, Loughborough University, UK): The Ergonomics of Wheelchair Configuration for Optimal Sports Performance.

Claudio Perret (Schweizer Paraplegiker – Zentrum, Nottwil, Switzerland): Practical Application of the Heart Rate-Based Lactate Minimum Test in Wheelchair Racing Athletes Preparing for the Paralympics.

Lee Nolan (Department of Neuroscience, Karolinska Institute, Stockholm, Sweden; Department of Rehabilitation Jönköping University, Sweden): Long Jump Technique of Elite Amputee Athletes.

16:40-18:20 SESSION B – FREE COMMUNICATIONS VI

VISTA Room 2

Biomechanics and Technological Development

Moderator: Sean Tweedy (School of Human Movement Studies, University of Queensland, Brisbane, Australia; Member IPC Classification / Sports Science Committee)

16:40 Kinematic Analysis of the 100 M. Race in Blind Athletes in Beijing 2008: **M. A. Torralba; J. M. Padulles; H Olsson; J. González-Lázaro; A. Theodorou (#19)**

17:00 Balance Mechanisms in Early and Late Stage Blind Paralympic Football Players: **O. Davies (#50)**

17:20 Alpine Skiing Paralympics (ASP) Athletes in Wind-Tunnel: **N. A. C. Vinagre; A. Dillmann; T. Russomano; A. Niklas (#28)**

17:40 Game Performance of Elite Ice Sledge Hockey Athletes: **B. Molik; N. Morgulec-Adamowicz; A. Kosmol; A. B. Yilla (#37)**

18:00 Time Analysis of Elite Ice Sledge Hockey in Paralympics 2010: **M. Häyrinen; J. Juntunen; M. Blomqvist; S. Övermark; B. Molik; A. Kosmol; N. Morgulec-Adamowicz (#48)**

19:30-22:30 **Closing Banquet with Paralympic Scientific Award Gala (Separate Registration Required)**
Poseidon Rhine Cruise

LIZ NICHOLL, OBE

Liz Nicholl, OBE is Chief Executive at UK Sport and has been with the organization since 1999. Liz has the experience of being both inside the boardroom and out on the field.

As Chief Operating Officer until September 2010 and Director of Elite Sport until the start of 2009, Liz played a leading role in the changing face of the elite sport system in the UK.

As CEO, Liz is responsible for leading the organization as it works to maximize British athlete success at the London 2012 Olympic and Paralympic Games, as well as seeking to ensure that both the best structure and resources available to high performance sport are in place in the years beyond.

Liz is a former international netball player and was the Championships Director of the 1995 World Championships. As Chief Executive of English Netball for 16 years, Liz steered the sport through a period of successful change.

Organizational Development in Paralympic Sport
1 September, 9:00

Organizational development is concerned with increasing an organization's effectiveness and viability through leading and driving positive change in beliefs, attitudes, values, systems and structures.

As the distributor of around £100million of public funds each year in high performance sport it is imperative that UK Sport is confident that the Olympic and Paralympic sports with which it works are providing the best possible support and environment for their athletes. As such, the need for these sports to operate robust, well led organizations is part of UK Sport's "no-compromise" approach to investment.

In addition to being the lead agency in high performance sport, UK Sport also runs a well established International Development Programme and, as part of this programme, has worked in partnership to strengthen sports systems within developing countries to improve participation opportunities for young people.

During this presentation Liz Nicholl, CEO of UK Sport, will highlight the key philosophies, decisions, actions and reflections that have taken the work of UK Sport in both high performance sport and international development to the forefront of best practice in the world. She will highlight how and why organizational development has been critical to the success of both strands of work, and how lessons learnt from the UK can help inform organizational development in Paralympic Sport world–wide.

PROF. YVES VANLANDEWIJCK

Yves C. Vanlandewijck, Full Professor in Rehabilitation Services at the Faculty of Kinesiology and Rehabilitation Sciences of the Catholic University of Leuven, obtained his PhD at the Leuven University in 1992. His research interests include exercise physiology, biomechanics and ergonomics, applied to locomotor disabled in a rehabilitation to elite sports continuum. Main research applications focus on the development of evidence-based classification systems in disability sports, with a particular interest in the relationship between intellectual functioning and performance of athletes with intellectual disability. He is the chairperson of the Sports Science Committee of the International Paralympic Committee.

Evidence Based Classification in Paralympic Sport
2 September, 9:00

The recently published IPC Position Stand on Classification in Paralympic sport (Tweedy & Vanlandewijck, 2011), states that the purpose of Paralympic systems of classification is to promote participation in sport by people with a disability by minimizing the impact of impairment on the outcome of competition. In order to minimize the impact of impairment on the outcome of competition, each athlete's impairment/s should be evaluated and classified according to how much it will impact on the core determinants of the sport in which the athlete will compete (Tweedy & Vanlandewijck, 2011).
Since the publication of the position stand, numerous reactions from the Paralympic Sports have indicated the complexity of the above concept in a sport-specific application. Confusion is caused by lack of knowledge of the sport-specific determinants of performance, combined with lack of understanding of the kinesiological complexity of sport-specific movement. Furthermore, the impact of impairment camouflaging strategies such as positioning and strapping have not been studied in depth and are sometimes in conflict with the basic rules and even with the core characteristics of the sport.
In this keynote, a sport-specific example will be presented, highlighting the principles of evidence based classification. Throughout the presentation it will become clear that the only road to successful evidence based classification will be through intensive collaboration between athletes, coaches, sport-specific experts from able-bodied and Paralympic Sport, classifiers, and sport scientists. This collaboration, however, should be framed in a management structure driven by the International Sport Organizations.

Tweedy SM, Vanlandewijck YC., International Paralympic Committee position stand--background and scientific principles of classification in Paralympic sport. Br J Sports Med. 2011 Apr;45(4):259-69. Epub 2009 Oct 22.

PROF. MIKE MCNAMEE

Mike McNamee is Professor of Applied Ethics at Swansea University, Wales, where he teaches healthcare and medical ethics. His research interests are in the ethics of medicine and healthcare and the ethics of sports, and research ethics. He is a former President of the International Association for the Philosophy of Sport, and was the founding Chair of the British Philosophy of Sport Association. He has served on the Executive Committee on many national and international associations including the European College of Sport Science, the International Council for Sport Science and Physical Education and the Philosophy of Education Society of Great Britain.

He is the founding editor of the journal "Sport, Ethics and Philosophy". He has written or edited (singly and in collaboration) 11 books in applied philosophy and ethics in sport and health, including Sports, Virtues and Vices: morality play (Routledge, 2008) Sports ethics: a reader (Routledge, 2010) and Doping and Anti doping Policy (with Verner Møller) (Routledge, 2011). His current projects include work on Ethical Aspects of Eating Disorders in Elite Gymnastics; and an international EU FP7 project on ethics of human enhancement.

**Challenges and Opportunities for the Paralympic Movement:
Ethical and Conceptual Issues
3 September, 9:00**

Human nature, athletic excellence, and species-specific limits (Or: Should a Paralympic athlete become an Olympic one?).

In this presentation I explore philosophically the ideas of human nature and potential and discuss how they may be thought to structure athletic excellence. It has been traditionally the case that reaching the species-specific limits of humanity is the goal of Olympic athletes under the motto "faster, higher, stronger". Nevertheless, recent challenges to species specific understanding of humanity from transhumanists (H+) and also athletes with species atypical structure and functioning, raise questions as to whether the "natural athlete" ought properly to be seen as the epitome of athletic excellence. While transhumanists seek to transcend human limits by technology, prosthetically ameliorated athletes seek to overcome embodied limitations within broadly therapeutic boundaries. A similar tension arises in the "apparent contradiction" between 'impairment' and 'athletic excellence', especially for athletes with severe impairment, who have high support needs. From within a medicalised conception of disability there is a causal relationship between impairment and disability that appears to clash with preconceived notions of athletic excellence. I explore what sense can be made of the concepts of human nature, athletic/Paralympic excellence, and humanity that may transform our conception of elite sport - Olympic and Paralympic – and discuss how this might affect eligibility issues in the future.

Social Legacy of Disability Sport

VISTA Room 1
1 September, 10:30

Moderator:

Jennifer Mactavish (Faculty of Kinesiology and Recreation Management University of Manitoba, Winnipeg, Canada; Member IPC Sports Science Committee)

Panel Members:

Willi Lemke (Special Adviser to the United Nations Secretary-General on Sport for Development and Peace)

Rosa López de D'Amico (Universidad Pedadógica Experimental Libertador (UPEL) – Maracay, Venezuela; Chairperson International Committee of Sport Pedagogy)
The Paralympic Movement to Lever Education and Awareness to Individuals with a Disability: Academic Perspectives Translated into Governance.

Tracey Dickson (Faculty of Business and Government, University of Canberra, Australia)
A Volunteer Legacy: The Rhetoric, the Reality and some Recommendations.

In recent years, the Paralympic Movement has achieved major success not only in the pursuit of sporting and athletic excellence. It has also been party to a revolution in the way nations of the world perceive the potential for societal change through staging major Paralympic Competitions.

Should the Paralympic Games Become the Games of the "Minimally Disabled"?
VISTA Room 1
1 September, 16:40

Moderator:

Yves Vanlandewijck (Faculty of Kinesiology and Rehabilitation Sciences Catholic University of Leuven, Belgium; Chairperson IPC Sports Science Committee)

Panel Members:

Verena Bentele (IPC Nordic Skiing Athlete)
Are Performances of Athletes with High Support Needs Really Elite? Challenges and Opportunities in Marketing Performances of Athletes with High Support Needs.

Sean Tweedy (School of Human Movement Studies, University of Queensland, Brisbane, Australia; Member IPC Classification / Sports Science Committee)
Should the Paralympic Games Become the Games of the "Minimally Disabled"? Issues of Leadership, Philosophy and Governance for the Movement.

Third panel member to be confirmed.

The Paralympic Games began in 1948. From those humble beginnings, the Paralympic Games are now one of the largest single sporting events on the globe, and its prominence on the international sports calendar is unprecedented. To maintain this prominence, and in order to keep the promotion of Paralympic Sport on an upward trajectory, one school of thought within the movement maintains that Paralympic events should be as fast and as athletically impressive as possible – approaching or bettering performances of non-disabled peers is often used as a benchmark – and the athletes competing should have training schedules and performances that permit them to integrate seamlessly into the same national training squads as their non-disabled peers. Athletes meeting these criteria are sometimes referred to as "real athletes" and the Paralympic athletes who fit this mould most readily are those with minimal impairments.

As the movement has matured, the number of Paralympic athletes who fit this mould is impressive and growing. Several Paralympic sports in the movement - Ice Sledge Hockey, Powerlifting, Sitting Volleyball and Wheelchair Curling - have classification systems which only comprise eligibility criteria, with no system for dividing eligible athletes into classes in order to minimize the impact of impairment on the outcome of competition. Consequently very few athletes with moderate to severe impairments are competitive at an international level, an outcome which ensures the sports have principally athletes that fit the traditional mould of a "real athlete". Events for athletes with moderate to severe impairments will necessarily be slower and the performances will be less like those of their non-disabled peers.

The symposium will debate whether inclusion of these athletes retards or enhances the development of the Movement and future directions the Movement should pursue this matter.

The Travelling Athlete

VISTA Room 1
2 September, 10:30

Moderator:

Walter Thompson (College of Education & College of Health and Human Sciences, Georgia State University, Atlanta, Member IPC Sports Science Committee)

Panel Members:

Cheri Blauwet (Department of Physical Medicine and Rehabilitation, Harvard Medical School Spaulding Rehabilitation Hospital; Member IPC Medical Committee).

Nick Webborn (The Sussex Centre for Sport and Exercise Medicine, UK; Medical Officer Team GB London 2012).

Wayne Derman (MRC/UCT Research Unit for Sports Science & Sports Medicine & IOC Research Unit for Injury Prevention and Protection of Health of the Athlete).

Travelling long distances for anyone can have various negative health consequences. An athlete with a physical disability has several additional medical sequels that must be considered or the athlete will become too ill to compete. To make sure that an athlete with a disability arrives for a competition in the very best condition, several precautionary steps in both preparation and planning should be taken. Strategies need to be in place to help prevent or overcome the inevitabilities of jet lag or extended car or train travel. Pre-travel risk assessment must be based upon sound medical knowledge of the athlete. Each athlete must be evaluated separately and distinctly from other athletes even when they compete on the same team.

A physician or therapist travelling with a team will need the necessary skills, experience, and equipment to optimize medical conditions based on the athlete risk assessment. The travelling athlete will be faced with unusual hotel or dormitory rooms that may not have the typical accessible amenities and dining, local transportation and training facilities may be different. In addition, food and the preparation of food may be different. In some cases, athletes and their training staffs may feel compelled to bring along their own food and have it prepared by their own cooks or dieticians. This symposium will focus on four important time elements for the travelling athlete:

1. Planning for the journey. Athletes will be confronted with both logistic and medical issues including travelling with a valid passport complete with required visas, immunizations specific to the country to which the athlete is travelling, anti-malarial medications when needed, making sure that all medical supplies are ordered and packed including medications, catheters and dressings, travel insurance, sunscreen, compression stockings if needed and snacks for long journeys that do not include restaurant stops.

2. The journey itself. Athletes who travel in aircraft must be conscious of transfer mechanics from a wheelchair to the aircraft seat, ensuring that flight stockings are worn for compression purposes, fluid (not alcohol) intake is adequate during the flight, adjustments made for the change in time zones, and when taking medications, making sure

that the medications are taken at the correct time.

3. Arriving at the destination. Hydration status is a key indicator to good health (athletes must be well hydrated to avoid dehydration which could lead to other more serious complications). Athletes and their medical support teams should check for swelling, especially of the legs, which can be avoided if proper leg compression stockings are used. Pressure areas (buttocks, feet and ankles) should be checked for any evidence of skin breakdown.

4. Return travel. It is just as important to arrive home healthy as it was to travel and to compete healthy. Time zone changes will be reversed so athletes can experience jet lag again. It is generally accepted that it takes one day to recover for each one hour zone difference which becomes important when an athlete is trying to get back on a normal sleep schedule.

Athletes must understand elite competitions will take place away from home, sometimes with a time difference that is completely flipped (day is night, night is day scenario). Athletes and their medical support must understand this inevitability and plan accordingly.

Performance Enhancing Agents – When are You Crossing the Line?
VISTA Room 1
2 September, 16:40

Moderator:

Peter Van de Vliet (IPC Medical & Scientific Director)

Panel Members:

Fabio Pigozzi (University of Rome "Foro Italico", Rome, Italy; President International Federation of Sports Medicine (FIMS))
Supplements or Good Diets?

Matthias Struppler (Schweizer Paraplegiker – Zentrum, Nottwil, Switzerland; Member IPC Anti-Doping Committee)
The Role of Physicians in Paralympic Athlete's Drug and Supplement Use

Alain Vernec (WADA Medical Director)
WADA Perspective on Performance Enhancing Agents

Nutritional and pharmacological recommendations for an athlete must be taken into consideration to assist the athlete to prepare for training and competition. This requires an understanding of sport nutrition principles and its interaction with body composition, as well as of medications and pharmacological supplies that adhere with actual standards of doping and drug free sport.

The symposium will focus on 3 important aspects of nutritional and pharmacological 'fine-tuning' of Paralympic athletes in light of performance enhancement.

1. The importance of good nutritional recovery practices has become increasingly apparent. However, there is no "one size fits all" approach, nor should the value of different nutritional supplements be overestimated. Besides the recovery strategies by sport and for different environments, its application to Paralympic athletes require reflections on the nature of the impairment and its impact on functional capacity, the use of medications, and any co-existing medical conditions.

2. Paralympic athletes often have to be treated with medications due to their impairment or intensive sports participation, or due to secondary health problems affiliated with the impairment. This may vary from exercise-induced bronchospasm over hypo- or hypertension, urinary tract infections and muscle spasticity to diabetes mellitus and seizure disorders. Pharmacological literature unfortunately does not offer much relevant information concerning the effects of medication on exercise performance in Paralympic athletes, which puts particular emphasis of the important role of team physicians.

3. The personal and financial rewards of modern-day sport can create an unhealthy desire to win at all costs also exists in the Paralympic Movement. To gain a competitive advantage, some athletes therefore find their way to so-called ergogenic aids, which enhance sporting performance beyond that attainable through genetic ability and sustained effective training. Ergogenic aids including pharmacological (e.g., performance enhancing drugs) and physiological (e.g., blood doping) supplies, is commonly referred to as "doping". A discussion on nutritional and pharmacological strategies in Paralympic athletes therefore cannot go without consideration of prohibited substances and prohibited methods.

The Structure of Sports within the Movement

VISTA Room 1

3 September, 10:30

Moderator:

Peter Bukhala (Kenyatta University, Nairobi, Kenya; Member IPC Sports Science Committee)

Panel Members:

Gudrun Doll-Tepper (Fachbereich Erziehungswissenschaft und Psychologie, Freie Universität Berlin, Germany)
Paralympic Movement: How Far Have We Come?

Xavier Gonzalez (IPC Chief Executive Officer)
Future of Paralympic Sports in a Fast Changing Environment of Increased Professionalism.

Sarah Springman (Institut für Geotechnik, Eidgenössische Technische Hochschule Zürich, Switzerland; Vice President International Triathlon Union)
The Inclusion of Par-divisions in Olympic Sport Federations: Opportunities and Challenges.

From that initial medical model, the Paralympic Movement evolved to an athlete-centered structure in which the governance of all current 25 Paralympic sports falls under the responsibility of different bodies: International Federations (IFs), International Organizations of Sports for the Disabled (IOSDs), or the International Paralympic Committee (IPC). An International Federation is an independent sport federation recognized by the IPC as the sole world-wide representative of a sport for athletes with a disability that has been granted the status as a Paralympic Sport by the IPC. A Paralympic Sport can be either integrated in an able-bodied IF (e.g, Para-Cycling is part of UCI), or can be governed by an independent body set up for one particular Paralympic Sport (e.g. IWBF for Wheelchair Basketball). An IOSD Sport is a sport for athletes with a disability on the Paralympic Programme governed by an International Organization of Sport for the Disabled (e.g. Goalball is governed by the International Blind Sports Federation (IBSA)). Third, the IPC itself serves as the International Federation for nine sports, for which it supervises and co-ordinates competitions.

Moving away from disability-based sports organizations towards self-governing sports organizations and independent federations has allowed for a more democratic participation of the athletes in the material decisions about their own sports and lead to increased respect that Paralympic athletes gain for their efforts, achievements and medals. But in an ever changing environment with increased demands to professionalism, significant challenges may occur to support the athlete achievements if these structures are not properly managed or professional structures are not anticipated upon.

Paralympic Sports' Research Findings Application - Linking the Laboratory and the Field
VISTA Room 1
3 September, 16:40

Moderator:

Osnat Fliess-Douer (Wingate College, Israel; School of Education Bar – Ilan University, Israel; Member IPC Sports Science Committee)

Panel Members:

Barry Mason (Peter Harrison Centre for Disability Sport, Loughborough University, UK)
The Ergonomics of Wheelchair Configuration for Optimal Sports Performance.

Claudio Perret (Schweizer Paraplegiker – Zentrum, Nottwil, Switzerland)
Practical Application of the Heart Rate-Based Lactate Minimum Test in Wheelchair Racing Athletes Preparing for the Paralympics.

Lee Nolan (Department of Neuroscience, Karolinska Institute, Stockholm, Sweden; Department of Rehabilitation Jönköping University, Sweden)
Long Jump Technique of Elite Amputee Athletes.

In 1993, the IPC established the Sports Science Committee as an indication of its commitment to the advancement of knowledge of Paralympic Sport. Since then, research

has become an important element on the IPC agenda. Research in Paralympic sports covers a wide spectrum of topics from different domains, including biomechanics, physiology, medicine, philosophy, sociology, technology, psychology and more. Regardless of an extensive research activity in the field of Paralympic sports, it has been noted that there is still a gap between research and practice (Bhambhani, 2001). During the Beijing Paralympic Games, while conducting research among athletes with SCI, athletes were claiming that despite active participation in research over the years, studies results have not been brought to their attention afterwards.

In order to optimize the performance in Paralympic sports, applied research must focus not only on what to investigate, but also on how making a direct connection between the 'lab' and the field, by mean of presenting significant research findings to Paralympic sports professionals.

New knowledge providing useful information for coaches and athletes on several aspects such as: which equipment and devices will allow athletes to perform at higher proficiency levels; which training method to use in order to maximize abilities and reducing injuries risks; which components within the sport to prioritize during training, etc.

An example for creating a link between science and field is the recently published book 'The Paralympic Athlete', which is a comprehensive guide to Paralympic athletes providing practical information on medical issues, biological factors during performance and physical conditioning (publication supported by the Medical Commission of the International Olympic Committee and the guidance of the IPC Sports Science Committee). The VISTA conference also provides an excellent opportunity for scientists to inform the coaches and athletes of important research findings that may affect the way they train.

This symposium is particularly useful for trainers and athletes, and it aims to: (1) introduce recent findings on physiological and biomechanical training tools to enhance the performance of athletes; and (2) to develop awareness among coaches and athletes to search for a relevant recent research findings, in order to improve training programmes and to increase athlete's abilities.

The following abstracts appear precisely as we received them. They have not been edited for e.g. language, spelling, or grammar, and the IPC does not take any reponsibility for the content.

#1

Development of Table Tennis Specific Classification System for Players with Intellectual Disabilities

SK Wu; G Vecko; N Verspeelt; Y Vanlandewijck; D Van Biesen J Stefak; A Burchell (National Taiwan College of PE; ITTF)

International Table Tennis Federation has included players with intellectual disabilities in the 2012 Paralympic Games. The credibility and application of the classification system needs to maintain fairness for players with ID and prevent cheating. The purpose of this study was to describe the developmental process in table tennis (TT) specific classification system for players with ID. Classification materials for athletes with ID were completed. More scientific evidence is being developed to monitor longitudinally the outcome of ID classification in TT and confirm the fairness of the TT-specific system for ID, and educate competent classifiers.

Keyword(s): intellectual disability; physical disability; classification process; theoretical framework; 3S & 3C principles

#2

Analysis of Table Tennis Performance and Functional Standing Classification System at The 2002 and 2010 World Championships

SK Wu (National Taiwan College of PE and ITTF)

The purpose is to examine the relationship between the performance and classes of standing male players with physical disabilities at the 2002 and 2010 World Championships in order to identify the effectiveness of the functional standing classification system in table tennis. 94 players at the 2002 World Championships and 89 players at the 2010 World Championships from classes 6 to 10 were analyzed in the open event. Data including players' names, countries, games won or lost in the open event, and classification were collected. The results of both events revealed that the higher the class, the better the performance. From the perspective of table tennis performance, the table tennis classification system for most standing players was fair for both major championships. Based on the results of this comparison study, this is clear evidence for the fairness of using functional classification system to elite players in physical disabilities.

Keyword(s): Physical disability; classification; standing player; fairness; outcome analysis

Acknowledgement(s): ITTF and IPC

#4

Technical Development of a Multi-Axis Ankle Prosthetic Component as an Aid for the Lower Leg Amputee Equestrian Paralympics' Rider to Achieve Optimum Balance and Alignment.

D. Lyle (Adaptive Sports Ankle Prosthetics LLC, The Woodlands, Texas, USA)

The most important aspect of achieving Equestrian Dressage performance excellence is maintaining postural alignment in the saddle and stirrup.
[Dressage, in essence, is the classical ballet of equestrian training encompassing a relationship of precision control of the human frame in coordination with the precision movements of the horse. The rider's control of his/her body and center over the horse's center of gravity provides the optimal pathway for communication and cooperation between horse and rider.] A

The objective of the multi-axis ankle is to provide the rider with angular flexibility in a three dimensional orientation, thus obtaining the balance of weight and pressure in the saddle seat and stirrups required to establish correct postural alignment, such that the rider's center of gravity passes directly through and works in conjunction with the horse's.

Proper body angulations are what establish the contact between horse and rider. The ideal riding position is with the body weight evenly distributed over the centerline of the foot, with the ball of the foot flat on the stirrup iron with heel slightly lower; the foot transversely rotated in the same plane as the femur. It is critical the rider keep even pressure across the foot, rather than pushing on the inside or outside of the stirrup iron.

Incorrect distribution of the rider's weight may cause a miscommunication between horse and rider, may disturb the horse's balance and rhythm, thus creating a less than desired performance or an unsafe situation.
The multi-axis ankle prosthetic component is designed to allow for the following angular movements:

A. Dorsi flexion 15°
B. Plantar flexion 30°
C. Inversion 20°
D. Eversion 10°
E. Transverse alignment +/- 15°

The ankle is pre-ride transverse aligned specifically for rider preference, and manually placed in action (dorsi/plantar flexion) by pulling a lanyard within the rider's boot.

This presentation will introduce a new ankle prosthesis component believed to be a 'game changer' for the Lower Leg Amputee Equestrian Paralympics rider at all skill and performance levels, and enhance rider/horse safety by improving rider alignment and weight distribution.

Keyword(s): multi-axis, ankle, equestrian, dressage

Acknowledgement(s): A. Rider Biomechanics Technical Development for Dressage, Stephan M. Apatow. 2000; B. Physical Therapy. Merck Manual Professional. November 2005

#5

Investigation into the Support Requirements of School Aged (11-18 Years) Gifted and Talented Performers in Disability Sport

Tim Blowers; Jeanette Crosland; Dr Jonathan Katz; Victoria Goosey-Tolfrey (Peter Harrison Centre for Disability Sport)

Introduction: Teachers and schools play an important role in the sporting lives of young people, recognising their talents, supporting, advising and encouraging them towards a life time of participation and accomplishment. For young people with physical and sensory impairments the pathway is even more complex. This investigation explores the challenges the young people and their families' encounter along this pathway and explores the question, how can talented young people in disability sport be better supported?

Purpose: To investigate the role of schools in assisting and delivering world class support to talented and gifted athletes in disability sport. Examining current levels and perceptions of required support from interviewing athletes, coaches, parents, support staff, NGB's and schools.

Methods: Survey sent out to NGB's of 24 Paralympic sports requesting numbers of school aged athletes in different talent pools. NGB's were also asked what markers they used when assessing competition, commitment and any other markers. Semi-structured interviews were conducted with twelve athletes, three parents, three coaches, seven support staff and practitioners from four schools. This data was transcribed verbatim and deductively analysed.

Results: From the NGB audit, it was clearly evident that swimming and athletics had a high representation of school aged athletes in both the senior and age group/development squads. Boccia had a large number of school aged athletes participating within the age group/development squads. The survey also highlighted competition and commitment markers NGB's used to identify talent and potential. The interview data was split into three main themes; the role of the school, sporting profile and perceptions. The schools were important for initiating participation and helping transition along performance pathways.

Conclusion: Schools play an important role in facilitating participation and forming suitable links with clubs. It is important they offer a range of sports and attempt to match ability whenever possible. Awareness of relative times and skill levels is important for all individuals and this requires exposure to disability sport. Clubs should assist progression to National levels of competition, and work closely with NGB's, schools and Universities to improve awareness, opportunities and development.

Keyword(s): world class support; school aged requirements; schools

Acknowledgement(s): Youth Sport Trust

#6

Integration of Wheelchair Tennis into The International Tennis Federation (ITF)

M. Bullock

The ITF was the first international federation to integrate the disability aspect of the sport. Formal integration took place in 1998 but the links with the ITF were in place from the 1980s. In a relatively short space of time wheelchair tennis has become very much accepted as part of the tennis family. Wheelchair tennis is played at all four Grand Slams - the Australian Open, Roland Garros, Wimbledon and the US Open. The NEC Wheelchair Tennis Tour now consists of 170 events in 46 countries and the year culminates with the NEC Singles Masters and the Invacare Doubles Masters. Wheelchair Tennis is featured in many ITF publications - ITF Year, ITF World, ITF This Week - as well as the wheelchair tennis department producing it's own publication Take Two. Wheelchair tennis has attracted several sponsors - Invacare, Camozzi, NEC and BNP Paribas - some of which were or are major sponsors of tennis. The rules of tennis permit a wheelchair tennis player to play against an able bodied player using the two bounce rule. This promotes inclusion and it is common for wheelchair tennis to play in able bodied leagues or play doubles with an able bodied player.

Keyword(s): integration; inclusion; wheelchair tennis

#7

Influence of Trunk on Wheelchair Propulsion: Using Evidence to Guide Classification System Review

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INTRODUCTION: The International Paralymic Committee (IPC) Classification Code directed sports to use evidence as the basis for examination of athletes to assign sport class. Consequently, the International Wheelchair Rugby Federation (IWRF) was charged with review of their classification system. Athletes with active trunk function were perceived to have an advantage in sport over those without trunk by many participants in wheelchair rugby. This view was confirmed by responses to a survey of participants, who identified trunk examination as a key area for improvement.

PURPOSE: A literature review was conducted to investigate the role of trunk musculature in wheelchair (WC) propulsion and mobility in daily activity and sport. The evidence was used to initiate the classification system review.

METHODS: Out of 15 articles identified from online databases such as Medline, CINAHL, and Cochrane, six were selected for review. Search terms were wheelchair propulsion, trunk, torso, wheelchair mobility, muscle, and activation. Findings were organized in three areas: mechanical energy (ME), muscle activation patterns during propulsion and effect of functional electrical stimulation (FES) applied to trunk muscles on propulsion power.

RESULTS: The evidence showed an increase in total ME from the trunk during WC propulsion through proximal joint translational power. Trunk movement and concentric contraction of musculature augmented forward and backward WC acceleration. Muscle activation findings proposed co-activation of spinal extensors and abdominal muscles during early and late phases of propulsion. Results suggested trunk muscles might be the most important force generating mechanism during fatigue or high resistance wheeling. FES applied to trunk muscles increased propulsion power, providing an enhanced base of support for the shoulder girdle allowing arms to be primary movers rather than stabilizers.

CONCLUSION: Trunk musculature appears to effect power and velocity of WC propulsion, affecting overall sport performance. Thus, trunk may be more important than currently valued in the classification system. As a result, evidence in the current literature supports the proposed changes in trunk examination in the IWRF classification system.

Keyword(s): wheelchair propulsion, trunk function, classification

Acknowledgement(s): Support from International Wheelchair Rugby Federation

#8

Talent Identification and Development (TID) Programmes of Paralympic Athletes in the UK, USA and Canada - A Cross-National Comparison

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Introduction and purpose of the study: There have been a number of attempts to identify the ingredients of successful elite athlete development (e.g. De Bosscher et al. , 2008). Preliminary studies have shown that an effective strategy for identifying talent is one of the key elements of a successful elite sport system in able-bodied sport as well as in sport for athletes with a disability (e. g. Brittain, 2006; Houlihan & Green, 2008; Howe, 2008; Thomas & Smith, 2009). However, it needs to be considered that research findings related to talent identification and development in able-bodied sport cannot be transferred directly into the sport for athletes with a disability. The extent to which different nations run successful talent identification and long-term athlete development programmes in sports for persons with a disability has not been explored. Whereas in Germany, most activities related to athlete identification and development are informal, other countries began to implement systematic programmes (Radtke & Doll-Tepper, 2010). The aims of the study are

(1) to gather information on the organisational structure of sport for athletes with a disability in the UK, USA
and Canada
.
(2) to investigate the criteria for quality in TID programmes in swimming, athletics, Alpine skiing, Nordic skiing and wheelchair basketball in the UK, USA and Canada, including three aspects of quality: structure, process and outcome.

(3) to compare the extent to which these quality criteria of TID programmes appear in the UK, USA and Canada.

(4) to learn from nations who achieve sporting success and consequently to create evidence-based recommendations for implementing systematic TID programmes in Germany.

Theory: Drawing on Donabedian's (1966, 1980, 1992) model of structure-process-outcome (to determine quality of care), this paper outlines a framework to analyse the quality of TID systems in Paralympic sport on the basis of the three quality dimensions structure, process and outcome.

Methods: During research phase 1 in 2010 (hypothesis development), data on the criteria for quality in TID programmes is collected using expert interviews (n = 65) with officials, head coaches and elite athletes representing different sports and disability groups. During research phase 2 in 2011 (hypothesis testing), a large survey of officials, head coaches and athletes representing different performance levels (n = 1368) will be conducted to compare the extent to which these quality criteria of TID programmes appear in the UK, USA and Canada.

Results & Discussion: The paper analyses data from the first research phase and ends by highlighting implications for talent identification and promotion as well as directions for future research.

Keyword(s): Talent identification and development (TID) programmes, Paralympic sports, cross-national comparison

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#9

Barriers and Facilitators of Sports for Dutch Paralympic Athletes.

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INTRODUCTION: Fifty-six percent of the physically disabled persons do not engage in sports, compared to 36% of the able-bodied. This inactivity increases the risk of developing secondary conditions such as vascular diseases, obesity and Type II Diabetes. Since the reasons why physically disabled persons do not participate in sports are unknown, it is important to understand what the barriers and facilitators of sports are for physically disabled persons. Relevant information can help policy makers to enhance facilitators and reduce barriers in order to increase the number of physically disabled persons to participate in sports and to increase the opportunities for potentially talented physically disabled athletes to develop which could lead to a higher level of Paralympic sports.

PURPOSE: The purpose of this study was to determine the barriers and facilitators of sports for Dutch Paralympic athletes.

METHODS: The subjects for this study were 149 Dutch Paralympic athletes, who were approached by National Olympic Committee & National Sports Federation (NOC*NSF) to fill in an online questionnaire. This research population was chosen because Paralym

pic athletes are active physically disabled persons and are likely to have experienced both barriers and facilitators of exercise. The questionnaire assessed personal and social barriers and facilitators of sports for physically disabled persons. Mean age of the participated athletes was 30.5 ± 9.7 years and 61% of the Paralympic athletes were female (76/149: 51%).

RESULTS: Main personal reasons for initiating sports were 'fun/relaxation' (78%) and 'health/improve physical fitness' (61%). 'Support from family' (40%) was the main social reason. Main personal motivators for maintaining sports were 'fun/relaxation' (82%) and 'health/ physical fitness' (76%), main social motivator was 'support from family' (41%). Two third of the athletes experienced 'being dependent of others' (22%), and 'not comfortable in the presence of other athletes' (13%) as personal barriers. 'Too little possibilities in the neighbourhood' (30%) was the main social barrier.

CONCLUSIONS: Main reasons for initiating and maintaining sports were fun, health gain and competition. Policy makers should focus on improving the amount of facilities, accessibility of facilities and information distribution for physically disabled persons.

Keyword(s): barriers, facilitators, sports, paralympic athletes, questionnaire

Acknowledgement(s): Supported by the National Paralympic Committee of the Netherlands.

#10

'Who's In and Who is Out?' - The Percieved Legitimacy of Including Certain Bodies within the Paralympic Games

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The perceived legitimacy of including certain types of impaired bodies within the Paralympic Games will be explored in this paper, using semi-structured interviews with a diverse range of stakeholders in the Paralympic Movement. These included current and former Paralympians, active and retired disability sport administrators and social researchers of disability and sport. Interviewee responses were critically analysed using aspects of Bourdieu's sociological theory (Bourdieu, 1977, 1984, 1993). This paper begins by critically analysing the IPC's current vision, mission and values. In doing so, we explore the potential for the Paralympic Games to have a sustainable future as an elite sports competition. The IPC's current mission statement highlights the need to develop opportunities for athletes with high support needs in sport at all levels (IPC, 2011).

Furthermore, the IPC believes individuals with moderate or severe impairments can be seen to demonstrate and promote the Paralympic values of courage, determination, inspiration and equality. To include only those individuals deemed 'minimally disabled' seems to contradict particularly the latter of these four Paralympic values, equality, which we will argue is a universally desirable entity both inside and outside of sport. As such does the perceived desire of the IPC to minimize the involvement of more severely

impaired individuals in the Paralympic Games programme risk undermining and contradicting its own core values? In answering this question we will explore the potential marginalisation at the Paralympic Games of individuals with severe physical impairments, those deemed as performing in an unaesthetically-pleasing manner and sportsmen/women with intellectual impairments. This paper highlights and discusses the rationales expressed by interviewees in support for, and against, the inclusion of individuals with minimal, moderate and severe impairments within the Paralympic Movement and compares them to the IPC's own stated vision, mission and values. In doing so, the paper gives Paralympic stakeholders a voice which we hope will add to the current debates surrounding the future of the Paralympic Movement.

Keyword(s): Bourdieu, marginalisation, minimal disability, Paralympics, social theory

Acknowledgement(s): Peter Harrison Centre for Disability Sport

#11

Improvement of the Classification System for Wheelchair Rugby: Athlete Priorities

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INTRODUCTION: The wheelchair rugby classification system was developed for athletes with spinal cord injury (SCI). Over the years, athletes with other health conditions entered the sport. The perception is that those athletes are at an advantage because of deficits in the classification system.

PURPOSE: To define priorities for improvement of the classification system for wheelchair rugby based on the opinion of the athletes.

METHODS: During the general assembly at the European Championships in 2009 all members could forward an area of concern in classification. A vote was made on the top three priorities by all representatives. A survey was formed from general questions about the classification system and specific questions about these priorities: trunk function, minimum eligibility and athletes with other health conditions. Participants were asked to reveal their role in the sport. Computer procedures were in place to allow only one survey submission per individual.

The survey was available at all three zone championships in 2009 and online from October 2009- April 2010. Athletes and other stakeholders in the sport participated.
To assess possible bias, the population who completed the survey was compared with the international classification database. Significance of any differences was calculated using the Fisher Exact test and Chi Square test.

RESULTS: 302 participants completed the survey; 196 self-identified as athletes. Comparing the participants to the database for nationality and sport class, there were no significant differences. 56% of all respondents thought 'the classification system is accurate but needs adjustments' and 41% 'the classification system needs to be com

pletely redone'. 72% supported that any athlete with tetra equivalent impairment can compete. 67% stated that the maximum value for trunk function should be increased. There was no significant difference in responses according to sport class. However, there was a difference in responses of nations with and without a dominant athlete without spinal cord injury and/ or with trunk function.

CONCLUSIONS: The survey was filled out by a representative sample of the wheelchair rugby population. It is unlikely that there is bias in responses based on language, sport class, or submission of more than one survey per individual. Team composition did play a role in the response, most likely to protect the team line up or a particular athlete. The current classification system is perceived to be accurate, but requires improvement in certain areas, specifically:
•Adjustment in evaluation of impairments of athletes with conditions other than SCI
•Adjustment to increase value of trunk function in assignment of sport class

Keyword(s): wheelchair rugby, classification, improvement.

Acknowledgement(s): International Wheelchair Rugby Federation

#12

Reliability of the Revised Trunk Classification System for Wheelchair Rugby

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INTRODUCTION: The first participants in wheelchair rugby were athletes with cervical spinal cord injury (SCI). They all had impairments in hand and arm function. Almost none of them had trunk function. Therefore the classification system developed to minimise the impact of the impairments on the outcome of the game had an emphasis on arm function (arm score 0.5-4.0). The trunk function in this system was less refined and had a relatively low maximum score (point value 0-1.0). The total athlete class is calculated from the average score for both arms and the trunk score. Athletes with the same sport class who have trunk function are perceived as dominant over athletes without trunk function. As athletes with impairments other than those associated with spinal cord injury enter this sport, particularly those athletes with minimal impairment in trunk strength, the need for improvement of the trunk function classification increases. A revision in the classification system for evaluation of trunk function was recently proposed based on a retrospective review of the classification database and expert opinion of the most experienced classifiers. This classification system has more categories for trunk function and the maximum value is increased to 1.5.

PURPOSE: To assess the reliability of the revised trunk function classification system.

METHODS: Sixteen wheelchair rugby athletes, 12 with complete or incomplete SCI and 4 with other health conditions and with a minimum of one year experience in the sport were independently classified by three internationally certified classifiers. The classifiers received a written description of the system prior to the testing. The classification

process was filmed. After the classification evaluations were completed, there was a discussion with the classifiers and researchers about any inconsistencies in testing.

RESULTS: There was full agreement in the trunk scoring amongst all three classifiers for the nine athletes with 0 points for trunk function (Kappa 1.0). There was less agreement in seven athletes with 0.5-1.5 for trunk function (Kappa 0.29-0.68). The discussion and video review revealed an incomplete description of the tests with respect to leg fixation, scoring of the test for asymmetry and the quality of movement in some tests.

CONCLUSIONS: The new trunk classification system shows good consistency for athletes with absent trunk function. For athletes with any trunk function present, the consistency is insufficient. However, clear reasons for these inconsistencies were identified. The description of the trunk function test was adjusted. Repeated assessment of the reliability of the revised trunk test after the adjustments will take place in early 2011.

Keyword(s): wheelchair rugby, classification, trunk function, reliability

Acknowledgement(s): national wheelchair rugby teams of the Netherlands and Belgium

#13

Validity of the Test-Table-Test for Nordic Skiing for Classification of Paralympics Sit-Ski Sports Participants

Dia H.F.M. Pernot, MSc, Anne M. Lannem, MSc, (Henk A.M. Seelen, PhD)

Design: Cross-sectional study

Objective: To assess the interrater reliability and validity of the Test-Table-Test with which Paralympic sports participants involved in Nordic sit-ski sports may be classified.

Setting: Movement laboratory in a rehabilitation centre, the Netherlands.

Methods: Thirty three persons with a spinal cord injury caudally to Th2, a leg amputation, poliomyelitis affecting the trunk and/or lower extremities or cerebral palsy participated. Subjects were classified according to a classification system for Nordic skiing (i.e. five subclasses between LW10 and LW12) by two raters, involving, among others, a combination of four balance tests called Test-Table-Test. Validity of the Test- Table-Test was investigated using a gold standard, involving balance perturbation tests on a force plate and Centre of Pressure displacement measurements.

Results: As to interrater reliability, Spearman rank-correlation coefficient was 0.95 ($p<0.001$). As to validity of the Test-Table-Test, correlation coefficients ranging from 0.61 to 0.74 ($p<0.001$) were found when comparing data to the gold standard.

Conclusion: Interrater reliability was high in both scoring and classification. As to Test-Table-Test validity, strong positive correlations between centre of pressure (CoP)

displacement and Test-Table-Test classification were found. Overall, the results of this study show that the Test-Table-Test is a reliable and valid test. However, the relations between Test-Table-Test and CoP displacement in the LW10 and LW10.5 sub

classes found in this study are somewhat vague, which could be due to the small number of participants in these subclasses. For the LW10 and LW10.5 subclasses further refinement of the four tests within the Test-Table-Test is warranted.

#14

Sport as a Tool for Improved Health and Social Empowerment in Women with Spinal Cord Injury - Overcoming Double Discrimination

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Although global figures vary due to reporting techniques, the current prevalence of spinal cord injury (SCI) is estimated at approximately 2 million individuals. It can be assumed that a large proportion of these are women. Innovations in medical technology and improved mobility devices have enhanced the life expectancy of those with a SCI to approach that of the general population. Consequently, cardiovascular disease, heavily influenced by preventable conditions such as obesity and hypertension, now ranks as the second-leading cause of mortality worldwide for this population.

It is widely known that regular, vigorous physical activity is a key factor to prevent this progression. Although research has proven this to also apply to individuals with SCI, rates of participation in sport and physical activity fall far below that experienced by able-bodied individuals. Barriers to participation are multifactorial and include inaccessibility of facilities, capacity of sports staff, and most importantly, deeply rooted social stigma. For women with SCI, this stigma persists and is often potentiated by inequities related to gender. This phenomenon is referred to as 'double discrimination.' Although little scientific evidence has yet elucidated the direct, quantifiable impact of sport specifically on women with SCI, numerous individual athletes and sports-specific women's teams have anecdotally proven its power to simultaneously enhance health, social integration, and personal empowerment.

Utilizing the reach of the Paralympic Movement, a global physical activity and sport initiative may provide the necessary catalyst to stem the tide of double discrimination. Through enhanced opportunity to participate in physical activity, sweeping improvements in health outcomes for women with SCI can be achieved. Simultaneously, through participation in both grass roots as well as high-profile organized sport, women with SCI will become increasingly available to contribute, lead, and provide mentorship to others. Additionally, this paradigm will serve to deepen the pool of potential female Paralympians for many years to come, and ensure that all women who have experienced SCI may embrace the opportunity to fulfill our Paralympic ideals: to inspire and excite the world.

Keyword(s): women with disabilities, spinal cord injury, double discrimination, physical activity

#15

Submaximal Exercise Responses in Tetraplegic, Paraplegic and Non Spinal Cord Injured Elite Wheelchair Athletes

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INTRODUCTION: The analysis of submaximal exercise responses has received little attention in wheelchair athletes, especially in those with tetraplegia. It therefore remains unclear whether similar exercise prescription/monitoring, based on physiological markers, can be applied to subgroups of wheelchair athletes with different disabilities.

PURPOSE: The purpose of this study was to explore the comparability of submaximal exercise responses across three subgroups of wheelchair athletes

METHODS: Twenty-five elite wheelchair athletes, divided into three subgroups (8 tetraplegic (TETRA), 9 paraplegic (PARA), and 8 non spinal cord injured (NON-SCI)), performed submaximal exercise blocks on a treadmill, covering a range from 40 - 80% peak oxygen uptake (VO2peak). Spirometric and heart rate (HR) data were recorded continuously, blood lactate concentration (BLa) measurements and rating of perceived exertion scores (RPE) were obtained following each exercise block. Regression analyses were then performed to model the nonlinear VO2 - BLa and the linear HR - VO2 relationships.

RESULTS: Expressed as a function of BLa, no differences were found between subgroups with respect to %VO2peak (group mean±SD: 1.0 mmol L-1: 53.9±9.9%; 2.0 mmol L-1: 70.7±7.5%; 3.0 mmol L-1: 78.5±7.7%) and RPE (group mean (lower and upper quartile): 1.0 mmol L-1: 10.8 (9.9, 12.2); 2.0 mmol L-1: 13.6 (12.7, 14.3); 3.0 mmol L-1: 14.9 (13.7, 16.5)). Furthermore, no differences were found in the coefficients of determination of the HR - VO2 relationship in any of the subgroups (TETRA: 0.90±0.12; PARA 0.97±0.02; NON-SCI 0.96±0.04). However, VO2peak was significantly different between subgroups (TETRA 24.5±4.9mL•kg-1•min-1, PARA 34.9±5.1mL•kg-1•min-1, NON-SCI 42.0±2.8 mL•kg-1•min-1) and peak HR was lowest in the TETRA subgroup (TETRA 129±12b•min-1, PARA 184±10b•min-1, NON-SCI 186±11b•min-1).

CONCLUSIONS: Despite considerable differences in aerobic capacity (as measured by VO2peak), submaximal exercise responses did not differ between subgroups when normalised to VO2peak. These results therefore suggest that exercise prescription/monitoring using measurements of %VO2peak, BLa or RPE can be based on the same recommendations in all studied subgroups. This offers alternatives to HR monitoring particularly for TETRA athletes where, due to their reduced peak HR and therefore reduced HR reserve, we do not recommend HR-based exercise prescription/monitoring, despite the similar HR - VO2 relationship in all subgroups.

Keyword(s): Exercise prescription, wheelchair basketball, wheelchair rugby, lactate modelling, rating of perceived exertion

Acknowledgement(s): We would like to thank the Great Britain Wheelchair Rugby Association and the Great Britain Wheelchair Basketball Association for their support. We thank John Lenton for his technical input and appreciation is also extended to all sportsmen who volunteered to participate in this study.

#16

High Exercise Loads Depress Salivary Immunoglobulin A in Elite Tetraplegic Athletes

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INTRODUCTION: Long term depressions of salivary immunoglobulin A (sIgA) due to a high exercise load (EL) can increase the risk for upper respiratory tract infection (URTI) in able-bodied athletes (1). This may differ in tetraplegic individuals, as their impaired autonomic innervation has been shown to depress certain immune parameters at rest and alter exercise related sIgA responses.

PURPOSE: Therefore, the purpose of this study was to examine resting sIgA responses as a function of EL and episodes of URTI in elite tetraplegic athletes.

METHODS: Resting morning saliva samples at twelve pre-defined time points over five months were obtained from fourteen tetraplegic wheelchair Rugby players and analysed for sIgA. The 1-week average EL before sample collection and occurrence of URTI were recorded throughout the study duration. Regression analyses were performed to investigate the relationship between EL and sIgA secretion rate. Furthermore, relationships between sIgA secretion rate and occurrence of URTI were examined.

RESULTS: sIgA secretion rate varied considerably between and within individuals (range: 15-969µg/min) and was negatively correlated with EL ($P<0.05$), accounting for 8% of the variance. Furthermore, no significant relationships were found between sIgA secretion rate and subsequent occurrence of URTI. Finally, the average sIgA secretion rate did not differ between athletes contracting an URTI during the study period and their counterparts with no recorded URTI.

CONCLUSIONS: In line with findings in able-bodied athletes, negative relationships between EL and sIgA secretion rate were found in tetraplegic athletes. This may explain some of the higher infection-risk in wheelchair athletes with a high EL, which has been previously observed in paraplegic athletes (2). However, the weak relationship of EL and sIgA and the lacking relation between sIgA and URTI in the present study question the use of sIgA as a prognostic tool for the early detection of upcoming URTI in the studied population. Finally, we note that sIgA secretion rates in elite tetraplegic athletes are in the range of what has been observed in able-bodied athletes, which may support the positive role of exercise in this population.

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Keyword(s): Training, mucosal immune function, upper respiratory tract infection, wheelchair rugby

Acknowledgement(s): We would like to thank the Great Britain Wheelchair Rugby Asso

ciation for their support. Appreciation is also extended to all sportsmen who volunteered to participate in this study.

#17

A Movement Returning to Its Roots: Paralympic - Military Links in the Twenty-First Century

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Although most historical texts regarding the Paralympic Games make reference to the fact that they grew out of the rehabilitation of spinally injured British veterans of World War II at Stoke Mandeville hospital, any explicit link between the Paralympic Games/ disability sport and conflict situations appears not to have been researched. Yet nearly sixty years later there are a number of programmes that now use sport as an integral part of the rehabilitation of soldiers injured in current conflicts such as Iraq and Afghanistan e.g. The Paralympic Military Program and 'Wounded Warriors' (USA), 'Soldiering On' (Canada), 'Battle Back' (UK) and the Australian Defence Force - Australian Paralympic Committee programme. In some cases these soldiers are fast-tracked into that nation's Paralympic training programmes.

The fact that these programmes exist gives some indication of just how important disability sport and the Paralympic Games have become as a tool in attempting to re-build the lives of military personnel who have been victims of violent conflict. This paper will look at some of the reasons why the military and the National Paralympic Committees in the countries named above might have chosen to develop these programmes including the potential benefits for each party. It will conclude by considering what long term impacts such programmes might potentially have upon future Paralympic Games.

Keyword(s): Paralympic, Disability, Military

#18

Energy Expenditure and Physiological Responses between Classification Groups in Wheelchair Basketball

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INTRODUCTION: Classification in wheelchair basketball is highly dependent upon functional capacity. That said, there have been notable physiological differences between the International Wheelchair Basketball Federation (IWBF) classes which can be used to guide training. However, there is limited information relating to the energy expenditure of wheelchair basketball game play that may help guide an individual's nutritional strategy.

PURPOSE: To estimate the energy expenditure of competitive wheelchair basketball play and examine the competitive physiological demands of wheelchair basketball players in relation to IWBF classification.

METHODS: Fourteen male international wheelchair basketball players participated in this study following informed consent. According to the IWBF classification system these players were divided into groups LOW (class 1 - 2.5, n=7) and HIGH (class 3 - 4.5, n=7). Heart rate (HR) was collected during competition using the Polar team system (Finland). Match start time, substitutions and time-outs were recorded allowing calculation of whole basketball play (WBP) which included time-outs and end of quarters. Actual basketball playing time (APT) (court time only) was also calculated. A 5-7 stage incremental speed based exercise protocol and •VO2 peak test was completed on a treadmill within two weeks of the aforementioned competition data collection. HR was monitored continuously, blood lactate (BLa) was determined from a capillary blood sample taken at the end of each stage and oxygen uptake was obtained at each stage using the Douglas bag technique. Energy expenditure was calculated according to Frayn (1983) and individual regressions were created to estimate energy expenditure from match play HRs.

RESULTS: There was a tendency for energy expenditure during WBP to be higher in HIGH (822(161) kcal h-1) compared to LOW (687(189) kcal h-1) (p=0.09). Similar trends were noted for APT (845(170) vs. 709 (122) kcal h-1; HIGH and LOW respectively, p=0.10). Mean HR during APT was significantly higher in HIGH (170 b.min-1) vs. LOW (162 b.min-1), p=0.05. There was no difference in •VO2 peak between groups. However, at BLa threshold, •VO2 (1.84(0.40) vs. 1.43(0.18) L min-1), HR (131(4) vs. 119(5) b min-1) and treadmill speed (3.5(0.41) vs 3.0(0.22) m s-1) were significantly higher in HIGH compared to LOW respectively.

CONCLUSIONS: Class 3-4.5 wheelchair basketball players tended to expend more energy during competition which is likely to have been due to their greater functional abilities during game play when compared to LOW point players. The HIGH group had the potential to work at higher exercise intensities before the onset of BLa accumulation when compared to the LOW group.

Keyword(s): metabolism, heart rate, wheelchair exercise

Acknowledgement(s): We would like to thank the Great Britain Wheelchair Basketball As

sociation for their support. Appreciation is also extended to John Lenton, Katy Griggs and Susie Dyrbus for their assistance with the data collection.

#19

Kinematic Analysis of the 100 M. Race in Blind Athletes in Beijing 2008

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INTRODUCTION: Time variable during the sprints is defined as the measure of effectiveness of the technique in the race for most of the authors. Time variable has two dependent variables, the distance and the average speed, which depends on the frequency and the length of the stride. Establishing a baseline data is essential to promote athletic development (Hay, 1985).

PURPOSE: The aim of our study was to identify the differences observed in blind athletes. Specifically, the categories of blind sprint athletes who participated in the final of the 100 meters in the Paralympic Games held in Beijing 2008. The study sample was 32 visually impaired athletes, men and women, participating in the final of the 100 m in the T11-T12 categories.

METHODS: It was performed a kinematic analysis in the blind and visually impaired athletes in the 100 m race in order to assess the variables: race time (s), average speed (m / s), number of strides, average frequency (Hz), average time of the stride (s) and average length of the stride (m), in order to the status and the sex of the participants. It was also extracted, the average of all the athletes and the standard deviation (SD), as an individual level of each disability and all of them together. The collected videos were extracted from the audiovisual records of the Center in Beijing Paralympic Committee (DVD). Frame Rate (fr / s): 30. Time frame 0.03333 and the program software for the analysis was the Kinovea 0.8.4.

RESULTS: In the male category, the average time of the race is 11.54 s (SD 0.44), and the number of strides is 50.49 (SD 1.95) with an average length of the stride of 1.98 m (SD 0, 07) and frequency of 4.47 Hz (SD 0.15). In the women category, the average time of the race is12.92 s (SD 0,35) and 54.04 (SD 1,87) strides. The average length is1.85 m (SD 0.06), and a frequency is 4.13 Hz (SD 0.74).

CONCLUSIONS: To assess the speed of movement, the stride length and frequency are significant. Therefore, the study of these variables helps to recognize the technique during the race. In regard to the visually impaired paralympics, they realize an appropriate stride size to the results obtained in the race, being more significant for less disabled athletes.

Keyword(s): Speed, blind, kinematic analysis Paralympic Games

Acknowledgement(s): Funding from Spanish Sports Federation for the Blind.

#21

A Comparison of Peak Physiological Responses during Handcycling and Arm Crank Ergometry

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Objectives: This study determined peak physiological responses, and explored their relationship during graded arm crank ergometry (ACE) and handcycling (HC).

Methods: Eighteen men (age 21 (2); yr, stature 1.80 (0.06) m; body mass 80.5 (8.4) kg) volunteered and provided written informed consent once the study had gained Institutional ethical approval. All participants completed the tests in a counterbalanced order; both tests started at 50 W with subsequent increments of 20W every 2-min. Respiratory and heart rate (HR) data were recorded continuously, and end blood lactate concentration (B[La]; mmol/L) was measured. Test time was monitored to determine final minute, peak power (Wpeak). Average values of VCO2 and VE calculated during consecutive 30-s intervals throughout each test were used to determine the work rate associated with the second ventilatory threshold (i.e., Vt2; the respiratory compensation point). The work rate associated with Vt2 was expressed in both absolute (W) and relative (%Wpeak) terms. The respective magnitudes of all parameters were compared using separate paired T-tests, and the relationships between them were explored by calculating correlation coefficients.

Results: Wpeak was higher during ACE [152 (23) W] compared to HC [128 (22) W]. No difference existed between end B[La] during ACE [10.9 (2.4) mmol/L] and HC [11.3 (1.6) mmol/L]. HRpeak was higher during ACE [184 (10) vs. 175 (10) b/min], and all other peak respiratory responses were higher ($P<0.05$) during ACE. Difference were observed for VO2peak [3.05 (0.55) vs. 2.60 (0.41) L/min], VCO2peak [3.53 (0.66) vs. 3.21 (0.47) L/min] and VEpeak [137.2 (32.4) vs. 125.9 (27.5) L/min], respectively. The absolute work rate associated with Vt2 was higher during ACE [116 (15) W] than HC [99 (16) W], but relative work rates were similar [77 (10) vs. 79 (13) %Wpeak, respectively]. Significant ($P<0.05$) correlation coefficients were observed for FMP ($r = 0.85$), absolute VO2peak ($r = 0.86$), relative VO2peak ($r = 0.88$), VEpeak ($r = 0.77$), HRpeak ($r = 0.77$), the relative work rate associated with Vt2 ($r = 0.78$) and end B[La] ($r = 0.81$). The standard errors of estimate for Wpeak (8.9 W), absolute VO2peak (0.15 L/min) and HRpeak 4.8 b/min) equated to percentage errors of 7.0%, 5.7%, and 2.8%, respectively.

Conclusions: While ACE generally elicited higher peak physiological responses, these data confirm that either test could be employed to provide an estimation of a participant's peak physiological responses and functional capacity using the alternative exercise mode. A strong relationship existed between many of the objective parameters, and further research is warranted in this emerging area using specifically-trained participants.

Keyword(s): Handbiking, functional capacity, exercise efficiency

#22

Wheelchair Tennis Match Play Demands: The Effects of Playing Experience and Player Ranking

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INTRODUCTION: Physiological responses during match play have been observed (Roy et al., 2006) but without consideration to the match outcome. Additionally, a comparison between individuals actively participating at different levels of the game will allow for a greater understanding of the range of responses which occur during tennis match play, and offer an insight into the optimal training strategies for developmental and elite wheelchair tennis players.

PURPOSE: To assess the heart rate and movement-based response to wheelchair tennis match-play for both developmental and elite players.

METHODS: Twelve male open-class wheelchair tennis players were monitored whilst taking part in an International Tennis Federation (ITF) tournament. An equal number of low and high ranking players were recruited. A custom data logger was used to record distance and speed data during match play. Heart rate was recorded using short wave radio telemetry. A three-way analysis of variance was used to determine if there was a significant main effect for a) ranking (<100 or >350), b) playing experience (<10 or >10 years), and c) result (win or loss) across all dependent variables (total distance (TD); distance moving in a forwards (TDf), reverse (TDr), and forwards to reverse direction (TDfr); distance per minute of playing time (TDm); maximum (Vmax) and average (Vavg) velocity; and average (HRavg), minimum (HRmin) and maximum (HRmax) heart rate).

RESULTS: Highly ranked players covered greater total distances (1922.0+944.7 vs. 1337.5-+369.8 metres) and maintained higher average speeds (1.16+0.12 vs. 0.81+0.10 m.sec-1) than their lower ranked counterparts. A significant main effect for player ranking was identified for all dependent variables (TD, TDr, TDfr, TDm, Vmax, Vavg, HRmax, HRmin, HRavg) with the exception of TDf. Higher-ranked players recorded higher values than low-ranking players across all dependent variables. A significant main effect for playing experience was identified in four cases (TDr, TDfr, HRmax and HRavg), with experienced players recording higher average values than players with less than ten years experience. Two-way and three-way interactions for all dependent variables were not statistically significant.

CONCLUSIONS: These data suggest that highly ranked players are more able to respond to the physiological challenges associated with wheelchair tennis match play.

Keyword(s): wheelchair tennis, training, physiological response

Acknowledgement(s): We would like to thank the tournament organizers for their support, and Dr Rory Cooper for providing data-logger testing equipment.

#23

The Training of Psychological Skills Viewed by Elite Coaches - A Case Study in Boccia.

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INTRODUCTION: The successful implementation of psychological skills training (PST) programs, in elite disability sport, has a direct relation with the importance that coaches acknowledge to the psychological preparation (PP) of their athletes. Consequently, prior to the implementation of PST programs it is relevant to understand the attitude of the coaches towards PP and when, how and which techniques the coaches apply.

PURPOSE: The purpose of this study was to explore the importance that elite Boccia coaches assign to the psychological skills (PS) of their athletes. Additionally, the approach of the coaches in order to promote the optimization of PS was analyzed.

METHODS: This single-case study was conducted on a Portuguese top elite female Boccia coach, with 13 years of successful coaching experience at international level. The data were collected from a semi- structured interview in 3 domains: i) knowledge in PP, ii) training of PS, and iii) sport and personal information. Content analysis was used to explore the collected information.

RESULTS: The coach accepted and underlined the importance of PP. However, she stated that her lack of scientific knowledge in the field of PS didn't allowed an appropriate intervention. The coach was convinced that athletes would benefit a lot if they could learn how: i) to focus and keep concentrated; ii) to deal with stress and anxiety; iii) to improve self-confidence, and iv) to apply relaxation techniques, either in practice or in competition settings. The maintenance of attentional control during Boccia games is a major concern for the coach. The athletes easily lose their focus (e.g. external noises) and, therefore, performance is affected. Several factors (e.g. results, medals, financial awards and knock out eliminations) were identified as sources of stress and anxiety for athletes. Relaxation techniques were not trained by the coach. During practice setting, imagery was requested but substantial improvements were not objectively observed. The use of key- words (e.g., 'you are better than him', 'I'm used to you to win') was another strategy used to increase motivation, self-confidence and attentional control (competition setting). Finally, short, medium and long term goals (goal-setting) were defined by the coach in dialogue with her athletes for practice and for competition settings.

CONCLUSIONS: The coach recognized the importance of the PS on athlete's performance. She applied some PS in practice and in competition settings. However, her strategies and methods were based on observations, experience and not scientifically supported.

Keyword(s): Boccia, Elite Coaches, Psychological Preparation, Psychological Skills, Training.

Acknowledgement(s): Funding from the Portuguese Foundation for Science and Technology (FCT).

#24

The Role of Rear-Wheel Camber on Optimal Mobility Performance in Wheelchair Athletes

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INTRODUCTION: Considerable advances in the designs and configurations of wheelchairs used for the court sports have taken place over recent years. An increase in the degree of rear-wheel camber has proven to be one of the most prominent developments in configuration. However, due to a lack of evidence based research, very little is known about the effects of camber on aspects of mobility performance specific to the wheelchair court sports.

PURPOSE: To explore the effects of rear-wheel camber upon sports specific aspects of mobility performance in elite wheelchair athletes.

METHODS: Fourteen highly trained wheelchair athletes (age 23 ± 6 yrs, mass 66.9 ± 14.3 kg) who played wheechair basketball (N = 11) and wheelchair tennis (N = 3) volunteered to participate in the study. Participants were assigned to two groups according to self-selected seat height (high and low), using the elbow angle elicited when sat upright in their own sports wheelchair. Participants performed a battery of three field tests in four standardised camber settings (15°, 18°, 20°, 24°) in an adjustable sports wheelchair. A series of performance measures were collected via a velocometer and analysed using a series of two-way ANOVA with repeated measures. Statistical significance was accepted at $P < 0.05$.

RESULTS: Twenty metre sprint times were significantly quicker ($P = 0.016$; $r = 0.63$) in 18° camber (5.89 ± 0.47s) compared to 24° (6.05 ± 0.45s). Higher mean velocities ($P = 0.006$; $r = 0.80$) were achieved in the 18° setting (3.00 ± 0.26 m s-1) compared to 24° (2.85 ± 0.25 m s-1), although no effect of camber was observed for the peak velocities reached, the number of pushes performed or initial acceleration over the first two and three pushes. The times taken to perform the linear mobility drill were also significantly reduced ($P = 0.004$; $r= 0.71$) in 18° camber (16.06 ± 0.97s) compared to 24° (16.62 ± 1.10s). Manoeuvrability and performance also improved meaningfully ($r = 0.72$) for 18° camber (9.18 ± 0.56s) compared to 15° (9.31 ± 0.52s). Significant interactions between camber, seat height and decelerations in between pushes revealed that players with a high seat position experienced an increased rate of deceleration in 24° compared to 15°, whereas those with a low seat height experienced similar rates ($P = 0.048$; $r = 0.62$).

CONCLUSIONS: It was concluded that one camber setting would not be optimal for all individuals, yet 18° may be a beneficial setting for young, inexperienced players given its superior performance for aspects of both linear and non-linear mobility performance.

Keyword(s): Wheelchair configuration, sports performance, wheelchair propulsion.

Acknowledgement(s): We would like to thank UK Sport for the funding of this research project and to the athletes from Great Britain Wheelchair Basketball and Wheelchair tennis sqauds who participated in the study.

#25

Evaluating Performance Progression in Wheelchair Rugby

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INTRODUCTION: Wheelchair Rugby (WR) is an intermittent type of sport game for male and female persons with a disability in both their lower and upper limbs. It is similar in many functions to wheelchair basketball (e.g., wheelchair propulsion, maneuvering, dribbling, passing, and blocking), but more aggressive, as players are allowed to bump into and collide with each other.

PURPOSE: The purposes were (a) to evaluate the structure of a field test composed of selected fitness and skill components, and (b) to describe the changes in the field test outcomes over a nine-month period of an intensive WR practice program.

METHODS: Sixteen WR players of a newly-established national league participated in this intervention, which included team and individual practice sessions. Five items of the Beck Battery of Quad Rugby Skills and a 10-min wheelchair push test were performed at the beginning (t 1), after three months (t 2) and after an additional six months (t 3) of practice. Two repeated measures t-tests (t 1 vs. t 2; t 2 vs. t 3) for mean data of at least 50% of the participants were performed. A principal component factor analysis with Varimax rotation was performed on all data points of each test. Bonferroni correction (alpha1 = alpha/k) for multiple comparisons (k = 2; p = 0.025) and Cohen's d effect sizes were used for interpreting the paired t-test comparisons.

RESULTS: The factor analysis revealed a two factor solution (Eigenvalues > 1), explaining 82.5 % of the variance. Significant improvements were found in the 10-min and in the sprint tests between t 1 and t 2, and in the picking and maneuverability tests between t 2 and t 3.

CONCLUSIONS: The test items used appear to have satisfactory validity. The training outcomes are consistent with the training goals with respect to training goals and periodization.

Keyword(s): wheelchair rugby, training, fitness, skills tests

#26

Wheelchair Basketball as a Medium for Removing Social Barriers across Ability and Nationality

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Wheelchair basketball (WB) is a recreational and competitive sport activity that has a long tradition as a disability sport. However, due to the technical developments in wheelchair technology and in game tactics, it may become an appealing game to many participants without a disability as well. This framework provides a unique opportunity for educational and cross-cultural inclusion activities.

The purpose of the present project was to develop a youth network of WB players, depicting a barrier-free image of wheelchair basketball. The project focused on experiences obtained during the game by participants with diverse genders, abilities, and ethnic and cultural origins.

During the period 2008-2010, eight new inclusive youth groups were established within Jewish and Arab communities in Israel, totaling about 100 new players. In addition, one Palestinian team was established in 2009 and has started bilateral meetings with one of the Israeli teams. All the new teams have comprised a social network of the young players as well as a platform for physical and mental training. The marketing of the game to the able-bodied population was facilitated through a series of game demonstrations and structured experiential workshops, in which schoolchildren of various Jewish and Arab communities, mostly in rural areas, participated.

The activity included training camps in Israel and abroad, where the young participants were introduced to tactics and advanced training methods led by international players and coaches, a competitive league, and bilateral meetings across the border of Israeli and Palestinian youth, focusing on collaborative and peace- promoting activities.

Keyword(s): wheelchair basketball, inclusion, social barriers, peace promotion

Acknowledgement(s): Peres Center for Peace in the Middle East; Israel National Insurance Institute; Lifegate Charity; Ilan Foundation

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#27

Inside, Outside, Nowhere is Home: Ethics, Ethnography and The Paralympic Movement

Dr. P. David Howe (Peter Harrison Centre for Disability Sport,Loughborough University UK)

This paper deals with the ethical dilemmas involved in the long-term use of the ethnographic tool of participant observation. The nature of ethnographic research places the social scientist in a privileged position. On the one hand there is a need to transfer knowledge to the academic community on the other this should not occur as a result of the exploitation of the people under investigation. Ethical considerations abound.

Will the representation of findings in any way harm the community that is the focus of study? Can the author be true to his/her understanding of social scientific enquiry and still have the best interests of the community at heart? These questions are central to the debate surrounding the use of all research data but the distinctive insider/outsider dynamic of good ethnography and the personal understanding of the community under the 'lens' make this considerations all the more pertinent. Using ethnographic data collected over 20 years as athlete, administrator, coach and journalist within the Paralympic movement this paper interrogates these dilemmas and suggests possible solutions to these fundamental ethical concerns.

Keyword(s): Anthropological lens, ethics, ethnography, Paralympics

#28

Alpine Skiing Paralympics (ASP) Athletes in Wind-Tunnel

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INTRODUCTION: Wind-tunnel (W-T) investigation of air loads on athletes was done as a part of the evaluation process of preparation for the 2010/2011 season. The intention was to correlate the drag data provided by the W-T experiment with body position of the athletes. The results that were obtained in this assessment should have an application for the understanding of those variables that can improve the postural performance of the athletes involved.

PURPOSE: The purpose of this research is to ascertain the drag coefficient of ASP athletes, especially those who are wheelchair-dependent, as well as determining the effects of air loads on the coordinative ability, and the relevance for their performance diagnostics and posture.

METHODS: The study protocol was approved by the Federal Committee on Competitive Sports (BL) and Federal Institute of Sports Science (BISp). Subjects were recruited on a voluntary basis after provision of written informed consent. The study was conducted on the basis of the data collection from 5 wheelchair- dependent and 2 standing ASP athletes; 5 male and 2 female. The age of male subjects ranged from 25 to 40 years, with an average height of 177.2 cm and weight of 71.8 kg. The 2 female subjects are 17 and 21 years old, 150 cm and 163 cm in height; 47 kg and 59.5 kg in weight, respectively. Conducted in a subsonic, atmospheric W-T at TUHH, tests were carried out to investigate the relationship between posture and relative wind speed of the standing and seated skier. A camera was positioned on the side of the W-T section, capturing stationary images of the skiers and was used in the analysis of data collected in this experiment. These images were used as a reference for average value found.

RESULTS: Drag force (D) and coefficient (CD) values obtained from the subjects (S6, S4) were plotted on 2 individual graphics enabling a greater awareness of their performances. The smallest D value was 11.243 N by S6 (4th pos., min. wind speed). The

highest value was 216.987 N by S4 (1st pos., max. wind speed). This initially leads us to believe that there is a direct relationship between the athlete body area and the aerodynamic forces produced. The minimum CD value is 0.303 (from a standing skier). The minimum CD value from a seated skier is 0.381. The maximum value is 0.815, related to S4.

CONCLUSIONS: In the W-T the athletes must take care of their posture. The drag force generated by the body area as a function of air resistance on the ASP athletes may represent a significant difference to the outcome. To maintain high performance posture they need to perform specific training to the trunk, arms and neck.

Keyword(s): Alpine skiing, aerodynamic forces, body posture, alternative evaluation environment.

Acknowledgement(s): German Aerospace Center(DLR), German Academic Exchange Service(DAAD), Hamburg University of Technology(TUHH), Sport Sciences Institute - Göttingen University, German Disabled Sports Association(DBS).

#29

Spiroergometry (SE) on the Treadmill and Stress Test (ST) on the Bycicle Ergometer for Alpine Skiing Paralympics (ASP) Athletes

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INTRODUCTION: Investigation to assist Alpine Skiing Paralympics (ASP) athletes with a SE being performed on a treadmill, and ST being carried out on a stationary bicycle, as part of an evaluation process for preparation for the season. The assessment was made with 6 subjects in 2 different sitting positions to check aerobic capacity of the ASP athl. The load factor which was found in this evaluation should be compared with the load factor obtained from the wind tunnel assessment of the same team, gained from an additional study.

PURPOSE: The purpose of this research is to verify the consumption of max. oxygen from ASP athletes. SE investigation procedures were used to examine their general physical efficiency and the function of the cardiopulmonary syst.

METHODS: The study protocol was approved by the Federal Institute of Sports Science. Subjects were recruited on a voluntary basis after provision of written informed consent. The Volunteers were submitted a pre test to detect cardiovascular diseases that could hinder performance during the SE and stress tests. The assessment was done with 4 athl. in their individual wheelchairs and 2 standing athl. on a bike. The age of male subjects ranged from 25 to 40 years, with an average height of 175.25 cm and weight of 71.5 kg. The 2 female subjects are 17 and 21 years old, 150 cm and 163 cm height; 47 kg and 59.5 kg weight, respectively. Wheelchair ergometry on the treadmill was used, employing a pulley syst. and auxiliary force admission. The test was per-

formed at a constant speed. Load was increased every 3 minutes (20W) until voluntary fatigue. The cardiorespiratory responses were continuously measured with a portable electrocardiogram. Blood samples were withdrawn from the ear lobe before and after the test to measure the blood lactate concentration.

RESULTS: The max. load factor, heart rate, lactate, VO2 max., max.VE values obtained from the wheelchair subjects were 100W, 184 b/min., 11.1 mmol/l, 2501 ml/min, 93.36 l/min. (S6) and 100W, 198 b/min., 10,1 mmol/l, 2137 ml/min, 97,27 l/min. (S1). The min. values was obtained from S2(Ω): 60W, 201 b/min., 8.5 mmol/l, 1607 ml/min, 63,82 l/min. The stand athletes values found were 400W, 174 b/min., 13,8 mmol/l, and
150W, 193 b/min., 12 mmol/l by S5(Ω).

CONCLUSIONS: The skiers could perform the different load procedures on the ST in accordance with the recommendations of the ICSPE. The raw data could be used as a reference for the next experiment and also enabled the athl. to have a better understanding of physiological responses. Athletes' pre-season motivation may be increased by the new evaluation method and may represent a significant difference in the season outcome.

Keyword(s): Paralympic alpine skiing, spiroergometry, oxygen comsuption, load factor, wheelchair- dependent.

Acknowledgement(s): German Aerospace Center (DLR); German Academic Exchange Service (DAAD); Sport Sciences Institute - Göttingen University; German Disabled Sports Association (DBS).

#30

The Testing and Training of Physical Performance Factors for Wheelchair Tennis Players

H. Guentzel, T. Ami, H. Takahashi (Tennis Training Center Kashiwa, Japan)

INTRODUCTION: Testing of physical performance factors for wheelchair tennis players became an essential component in preparation for the annual planning of tournaments

PURPOSE: The designed fitness testing protocol is based on analysis of the wheelchair tennis matches, and follows the principle that fitness routines should be very similar to the demands on court during a match. Because of the same conditions for the players during a match and for the comparison of the test results between the players, the differences in the grades of disabilities will not be considered for the execution and evaluation of the test results.

The main goal of testing was to determine the status of fitness and to design an individual fitness training program.
METHODS: The main physical performance factors which should be tested are mobility in the wheelchair, speed, power, and endurance.
The testing protocol includes 8 exercises:
- baseline-net dash and tennis ball throw for speed;

-T-turn movement in the wheelchair for mobility;
-medicine ball throw and resistance pushes for power;
-grip strength for strength;
-5 point fan run and 1 km run for endurance.
The test has been carried out since 2002 usually two times per year with competitive wheelchair tennis players of all levels. The range was players in the top 10 of the ITF wheelchair tennis rankings to players with low Japan national rankings.

RESULTS: Over the period of 8 years, 27 men and 10 women were tested.
The analysis shows a correlation between performance in the test exercises and the training age.
The level of development of physical factors and performance level in tennis are significantly connected.
The four of the eight test exercises (baseline-net dash, T-turns, ball toss and 5 point fan run) are very meaningful for the evaluation of the physical factors. Good results in these exercises before tournaments directly correlated with good results in tournaments.

CONCLUSIONS: The inauguration and continuous implementation of the fitness testing led to more purpose and variety in fitness training as well as supported the motivation, competitiveness and self- confidence, of the players. The evaluation of a player's physical state becomes more specific and should be carried more frequently.

Keyword(s): wheelchair tennis, testing, physical performance factors

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#31

Examining the IPC-IOC Relationship in Theory and Practice

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The relationships between the Olympic and Paralympic movements have been integral and significant since wheelchair sports were introduced on the fields of Stoke Mandeville Hospital in 1948 to coincide with celebration of the London Olympic Games. The first Paralympic Games in 1960 following the Olympic Games in Rome, and the more recent agreement between the IOC and IPC with regards to bid cities are all examples of how the two movements have symbiotically evolved. The proposed presentation will examine this evolution, and reflect on the future development of this relationship. More specifically, the authors will share research, analysis and critical thinking concerning the past, present and future of the IPC-IOC relationship. The authors will utilize historical, philosophical, sociological, and sport management perspectives. This presentation will provide alternatives for future relationships at both the theoretical and practical levels. The authors will examine the intersection of the symbolic, governance, and logistical relationships between IPC-IOC. Finally, the authors will discuss the global developments of individuals with disabilities in sport and in society, and the relevant applications and considerations for the past and present relations between the IPC and IOC.

Keyword(s): IOC, Olympism, symbols, governance

#32

Isokinetics Evaluation of the Knee in Paralympics Athletes: Athletics Modality

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INTRODUCTION: The evaluation isokinetics has been used in the last three decades as a method for determining the standard function of force and the balance muscular.

PURPOSE: To evaluate the peak of the concentric isokinetics muscular torque of knee extensors and flexors in Paralympics athletes of the athletics modality.

METHODS: Twelve athletes who were runners of speed tests participated on the evaluation (4 women and 8 men). Six of them had visual shortcoming, two of them had cerebral paralysis, and four of them had been amputated; moreover, five guidance athletes were evaluated too. The evaluations of the athletics standing team occurred in two moments: December 2009 and July 2010. The evaluations were accomplished through the Biodex System 3 Pro isokinetics dynamometer in the Exercise and Psychobiology Study Center. The evaluation protocol we used for the knee was at the following speeds: 60°/s (5 repetitions), 180°/s (10 repetitions), and 300°/s (15 repetitions). There was a one-minute interval between those series. That protocol was approved by the Ethics Committee on a UNIFESP research (2018/08).
RESULTS: On the evaluation of December 2009, nine athletes presented a deficit in the torque peak, higher than 15%, when the right and left extensor muscles, and the right and left flexor muscles were compared. Three of those athletes presented a strength deficit (19.1%, 92.9%, 17.7%) in the knee extensor muscles, four of them presented a deficit (21.4%, 23.7%, 79.5%, 40.9%) in the knee flexor muscles, and two of them presented a deficit in both, the flexor muscles (19.5%, 60.1%) and the extensor muscles (23.4% e 28.5%). However, the guidance athletes did not present any deficit in the torque peak. The coaches as well as the athletes, after the evaluations of the difference shown in the muscular strength, were oriented on the appropriate training in order to minimize that deficit. On the evaluation of July 2010, only three athletes presented a deficit in the torque peak for the knee flexor and extensor muscles.

CONCLUSION: We may conclude that the athletes presented a deficit in the torque peak; although, when they were oriented to accomplish specific strength training, the number of athletes presenting a strength deficit decreased. It has also been concluded that the isokinetics is an objective resource to evaluate and to control the training of Paralympics athletes.

Keyword(s): Isokinetics, Knee, Paralympics Athletes

Acknowledgement(s): AFIP, FAPESP (CEPID #98/14303-3 to S.T.); Brazilian Paralympic Academy - Brazilian Paralympics Committee; FADA - UNIFESP; CEPE; CEMSA.

#33

The Paralympic Sport and the Evolution in Brazil in the Last Four Paralympics Games: Atlanta - Pequim

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Brazil today is without a doubt, one of the great powers on the set of Paralympic sport worldwide and ranks among the ten greatest strengths of Paralympic sport in the world. This rise technique of the sport in Brazil has been accompanied both the administrative aspect of the organization, but also in respect of disclosure and seeking financial support to subsidize the needs of a high performance sport. In the last two decades the Brazilian Paralympic sport has undergone profound changes in all aspects in order to monitor developments and international development.

Thus, this study aims to conduct a quantitative and qualitative analysis of the evolution of the Brazilian Paralympic sport during the last four cycles Olympic Games, Atlanta - USA 1996 Beijing - China 2008. This analysis seeks to evaluate the evolution of the performance of Brazilian athletes in relation to the number of medals won in each of the Paralympics, as well as the evolution of the Brazilian Paralympic sport by comparing the number of sports played, number of members and athletes in general respective delegations during this period. By observing the results obtained in the last four Paralympic Games we can see that Brazil has a growing development in each. In Atlanta, even with the recent creation of the Brazilian Paralympic Committee Brazil was represented with a good team and winning 21medalhas in total. In Sydney we can observe a clear evolution in the performance of our country not only by increasing the number of gold medals than tripled compared to Atlanta, but also by the improved ranking making thirteen positions with just four athletes to more than 1996. Athens - 2004 we can clearly identify the major developments in the Paralympic sport in Brazil in all aspects, whether in the number of athletes, the total number of Delegation and the ranking where we can be among the 15 major world powers, but also by the aspect quantity and quality of medals conquistadas.BEIJING - 2008: The largest Brazilian delegation of all time, 319 members with 188 athletes, the fourth largest delegation of the Paralympic Games being among the ten major world powers Paralympic events 17 of the 20 sports offered .

In conclusion, the data presented above are compelling evidence of growth and development of Paralympic sport in Brazil

Keyword(s): Evolution, Brazilian Paralympic Sport

Acknowledgement(s): to the Brazilian Paralympic Committee

#35

Brazilian Paralympic Academy

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The Brazilian Paralympic Academy (BPA) is a Brazilian Paralympic Committee's project, based on three pillars: institutional academic relations; retrieval and production of publications and; formation of human resources (HR). Launched on May 11th 2010, the BPA has the following objectives: Systematize the knowledge on Paralympic Sports and contribute to the development of new researches that will improve the level of Paralympic Sports. The BPA is chaired by the president of the Brazilian Paralympic Committee (BPC) and has as its members the BPC's technical director and the medical coordinator, seven PhD professors from three partner universities, and a secretary who is post graduating in Physical Education.
In its initial actions the BPA set its internal bylaws aiming at establishing the role and functioning of the academy, of the BPC's Scientific Committee, and of the Paralympic Sports Professional Formation Center (PSPFC). In addition, rules and regulations were created to the researches, with the Brazilian paralympic teams, that have requests of authorization from the Brazilian Paralympic Committee. Main BPA's achievements:

Institutional relations: partnerships with the partner universities were implemented (UNICAMP, UFU and UNIFESP). A partnership was signed with a nationwide publisher that will release all the BPA's official publications.

Researches and publications: Two books were prepared, being one about paralympic sports and the other about wheelchair rugby, both to be released in 2011. Analysis of research projects, in order to obtain the authorization of studies with Brazilian paralympic samples, was carried out. In addition, the Ist Brazilian Paralympic Congress took place at UNICAMP, with the participation of Brazilian and foreigner guests with extensive experience on International Paralympic Sports.

HR Formation: Meetings were arranged in different regions of the country with professors from Brazilian public universities linked to the topic Paralympic Sports. The following courses were also approved: wheelchair fencing coaching, referee clinics on several sports, goalball coaching, and a Specialization Course in Paralympic Training. Powerlifting training centers were also created.

We believe that all the Academy's actions had or will have significant impact on the paralympic environment, the academic society and the media. However, we highlight the creation of the PSPFC (Paralympic Sports Professional Formation Center), the organization of the Specialization Course and the realization of the Ist Brazilian Paralympic Congress as the most relevant ones.

Keyword(s): Paralympic Sports; Sport Organization and Administration.

Acknowledgement(s): To the Brazilian Paralympic Committee - BPC

#36

Evaluation of Wellbeing and Hydration in Paralympic Athletes Preparing for The Games: Beijing 2008

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Introduction: The Beijing Paralympic Games offered a unique competition environment to travelling British athletes. It is well documented that environmental stress and travel has the ability to negatively affect athletes' wellbeing and hydration status.

Purpose: The purpose of this study was to describe the overall wellbeing responses to travel and climate change of elite Paralympic athletes. The second objective was to determine whether the support services provided at the simulation camp in 2007 led to effective strategies being used at the holding camp in 2008.

Methods: Following informed consent, wellbeing scores and daily urine samples were collected each morning for four consecutive days following the arrival to either Hong Kong/ Macau from the UK. Twenty athletes comprising of boccia, shooting, cerebral palsy football, rugby and table tennis sportsmen (n=18) and women (n=2) met the criteria of being present at both training camps. Their disabilities included cerebral palsy (n=8), spinal cord injury (n=10) and others (n=2). The (Mean ± SD) age of this group was 30 ± 9 yrs, with a body mass of 69.5 ± 13.7 kg. Fatigue, sleep quality, muscle soreness, irritability, confidence, mood, motivation, sleep quantity, recovery and health were subjectively scored on a scale from 1 to 10 (10 being most positive) to give an overall daily wellbeing score out of 100. Urine samples were tested for urine specific gravity.

Results: Overall wellbeing was not significantly different across the two camps but there was a significant effect of day ($P<0.05$), with lowest mean values occurring on day 2 (74± 4%) and significant improvements in this by day 4 (80± 3%). There were no differences in hydration status between the camps or indeed over the duration of each camp. Only a small percentage (11%) of all urine samples collected were classified as dehydrated. Interestingly, there was no relationship between hydration and wellbeing. There was a significant reduction in body mass after the first day of each camp suggesting an impact of travel on this physiological characteristic.

Conclusions: Wellbeing improved throughout the duration of both camps which suggests that the camp environment and support services provided a positive experience for the athletes, aiding their transit into the Games. In general, athletes were well prepared to maintain hydration despite travel and climate changes, suggesting effective strategies and education processes were put in place. However, it is important to note that there was considerable individual variability.

Keyword(s): Overseas travel, environmental stress, urine specific gravity

Acknowledgement(s): We would like to acknowledge the leadership of Paul Davies (formerly ParalympicsGB) and the assistance of Andy Somerville with data collection and John Lenton with analysis.

#37

Game Performance of Elite Ice Sledge Hockey Athletes

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INTRODUCTION: The game performance analyzes should be an additional component in the preparation of athletes participating in Paralympic Games. Moreover, the analyzes of individual game performance need to be used for confirmation of classification systems in team sport.

PURPOSE: The aim of the study was to evaluate the game performance level of elite ice sledge hockey players with regard to type of disability, and position in the game.

METHODS: Fifty four from the total number of 114 male athletes (with various physical disabilities) were evaluated during their game performance. The physical characteristics of the subjects were: age (mean ± SD) = 30.8 ± 8.4 yr, body mass = 76.2 ± 11.6 kg, height = 1.63 ± 0.3 cm. All twenty matches were recorded on three video-cameras during Winter Paralympic Game in Vancouver (13-20 March 2010). Twenty game performance parameters were selected for performance evaluation of ice sledge hockey athletes. Additionally, efficiency of shots (SE), passes (PE) and puck receiving (RE) were calculated. The games were analyzed after the tournament by five observers. All results were written down in Game Efficiency Sheet for Ice Sledge Hockey (GES-ISH). The questionnair and antropometric measurements were used to collect additional data (age, sport experience, training frequency, body mass, height, length of the sledge, arm reach in sited position, range of arms). All athletes were divided into four groups in relation to type of physical disability: double amputee (n=9), single amputee (n=18), spinal cord injuries, spina bifida (n=17), and other impairments (n=10). The game performance of individuals played as defensive (n=19) and offensive athletes (n=35) was compared.

RESULTS: The Kruskal-Wallis test indicated no significant differences ($p>.05$) between four groups of disability in any game performance parameter. The U Mann-Whitney test indicated significant differences ($p<.05$) for number of steals (puck interception), passes through blue line, efficiency of puck passes, and efficiency of puck receiving between offensive and defensive athletes. The Spearman correlation did not reveal significant relationship between game performance and length of the sledge, arm reach in sited position and range of arms of elite sledge hockey players.

CONCLUSIONS: Authors suggested correctness of classification system for ice sledge hockey players. Analyzes of game performance confirmed players' specialization depend on position (offensive and defensive).

Keyword(s): ice sledge hockey, game performance

Acknowledgement(s): This study was approved and supported by the International Paralympic Committee. This research has been supported by grant No DS-127 from the Polish Ministry of Higher Education and Science

#38

Applicability of Body Fat Prediction Equations in Athletes with Spinal Cord Injury

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INTRODUCTION: The proportion and density of body composition in individuals with spinal cord injury are different from the able body individuals. The evaluation of those variables is realized by field method. For a reliable result it is necessary to analyze the applicability of body fat prediction equations, that tend to underestimate the body fat in individuals with spinal cord injury (MOJTAHEDI et al., 2009; SUTTON et al., 2009; KOCINA et al., 1997; BULBULIAN et al.,1987).

PURPOSE: The aim of this study is to analyze the applicability of the body fat prediction equations compared with the results obtained by the Dual-emission X-ray Asorptiometry (DXA).

METHODS: Seventeen athletes from wheelchair handball and rugby, with spinal cord injuries (C4-T11) were recruited. All of them were evaluated by the DXA and anthropometry. Seventeen anthropometric general equations were used to compare the fat percentage obtained by the DXA (%BFdxa); four of them were selected. The results of fat percentage values obtained by DXA were correlated with the fat prediction equations results. The Wilcoxon signed rank test was used to compare the results between the equations and the Spearman's rank correlation coeficient (rho). The significant level adopted was $p \leq 0,05$. The statistic package R-Plus 2.10.0® was used.

RESULTS: The table shows only the equations results strongly correlated to the PGDXA. Table 1- Antropometric and body composition values in athletes with spinal cord injury (n=17).

Variable	Mass (Kg)	Height (cm)	BMI (Kg/m²)	BMD (g/cm²)	FM (Kg)	LM (Kg)	%Bfdxa (%)	EQ1 (%)	EQ2 (%)	EQ3 (%)	EQ4 (%)
Median	65.3	175.3	20.6	1.11	14.63	49.46	22.7	22.87	20.92	17.29*	17.69*
IQR	9.4	8.5	4.11	0.12	6.65	4.83	7.7	5.19	5.83	5.04	10.83
rho	-	-	-	-	-	-	-	0,76**	0,77**	0,76**	0,81**

Legend: BMD - bone mineral density (DXA); FM - fat mass (DXA); LM - lean mass total (DXA); %BFdxa - Percentage of body fat by DXA; IQR - Interquartile range; EQ1- Guedes Equation (1985); EQ2 -Bulbulian et all Equation (1987); EQ3 -Wilmore e Behnke Equation (1969); EQ4 -Sloan Equation(1967);

* significant equation difference related to %Gdxa by the p level established;
** significant relation to %G.

Two of the four equations did not differ significantla from the percentage found by the DXA (GUEDES (1985) and BULBULIAN et al. (1987)). The results did not allowed to

affirm that these prediction equations of fat can be used in the individuals recruited in this study because the correlation analysis were not consistent enough.

CONCLUSION: The study confirms the same findings from the literature, that the generalized equations are not useful to evalutate athletes with disability.

Keyword(s): evaluation, DXA, physical disability, body composition.

#39

Evaluation of the Relation between Anthropometric and Fat Percentage in Athletes with Spinal Cord Injury

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INTRODUCTION: Studies about the body composition in individuals with spinal cord injury have been conducted, but those evaluations are problematic because of the few validated parameters used.

PURPOSE: Evaluate the relation between the body fat percentage and the anthropometric variables in athletes with spinal cord injury.

METHODS: Seventeen wheelchair handball and rugby athletes, with spinal cord injury (C4-T11) were recruited. The individuals were evaluated using DXA and anthropometry. Body fat percentages by DXA (% BFdxa) obtained were correlated with the anthropometric measures by Pearson product-moment correlation coefficient (r). The linear regression analysis was used to find the best relation between the measures and the body fat percentage. The significant level adopted was $p \leq 0,05$. The statistical package R-Plus 2.10.0® was used for the analysis.

RESULTS: Only the abdominal circumference (AC) and the abdominal (AS), pectoral (PS), subscapular (SS) and triceps (TRS) (skinfolds) showed a significant correlation to the %BFdxa. However, the correlation coefficient that stood out was the abdominal skinfold (r=0,80). The same analysis did not reveal consistent values of the variables of mass, height and BMI. The regression analysis showed that only the AS presents a strong and significant correlation value, but with a high standard error (4,56).

Table 1. Anthropometric and body composition values in spinal cord individuals

Variable	Mass (Kg)	Height (cm)	BMI (Kg/m²)	BMD (g/cm²)	F (Kg)	LM (Kg)	PG (%)	AC (cm)	AS (mm)	PS (mm)	SS (mm)	TRS (mm)
Mean	66.05	175.44	21.52	1.15	16,23	48,9	24,41	82,61	23,44	12,73	17,62	9,26
SD	9.38	9.45	3.13	0.11	6,4	4,81	7,39	10,29	10,73	7,53	8,09	3,52
Min	49.8	157	16.6	1.02	8.15	40.75	14.8	69.5	9	4.1	7.6	4.4
Max	83	198.2	28.4	1.41	28.86	56.18	38	101.9	53.2	27.6	32.6	17.4
r	0,59*	ns	Ns	-	-	-	-	0,59*	0,80*	0,52*	0,74*	0,53*
R^2	0,30	-0,37	0,15	-	-	-	-	0,30	0,62	0,23	0,52	0,23
SEE	6,16	7,52	6,81	-	-	-	-	6,18	4,56	6,48	5,09	6,46

Legend: BMD – Bone Mineral Density; F – Fat mass; LM – Lean Mass; SEE – Standard Estimative Error; * significant correlation in $p \leq 0,05$;

CONCLUSION; The results did not allow to consider the anthropometric variables as a field alternative to body fat evaluation. However, the correlation values show a tendency of relation between the variables analyzed with the fat mass. New researches with a larger number of individuals with spinal cord injuries may show more evidence of the correlation appointed in this study.

Keyword(s): evaluation, physical disability, anthropometric, body composition, DXA

#40

Application of a Power Measurement Tool (The 'Powerwheel') in Wheelchair Racing

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INTRODUCTION: In wheelchair racing, the force and power delivered to the wheel is a key interaction, and measurements in this area have recently been made possible by the use a 'Powerwheel'. The 'Powerwheel' uses similar technology to power measurement tools used in cycling (e.g. SRM), displaying and recording the power, torque, speed and cadence, but also the position of push-rim contact and release and the distribution of power through the push. The Powerwheel enables field based data to be collected for improved coaching interventions, hitherto not possible.

PURPOSE: This purpose of this study was to exemplify the benefits of using detailed field based power, force, speed and cadence measurements in the investigation of typical wheelchair racing questions.

METHODS: Measurements were carried out using the 'Powerwheel' system, measuring torque (magnitude and positional distribution around the push rim), power, speed, time,

distance, etc at a rate up to 500Hz. The field tests involved sprints from standing start up to 30m with Powerwheel replacing athlete's right wheel on a track, a tarmac road, or a non-powered wheelchair roller system. The specific tests used were based on individual athlete requirements.

RESULTS: In each of the case studies, the data generated were applied to coaching interventions resulting in an improvement in athlete performance. With athlete A, the best of three potential starting strategies was confirmed - time to 10m of 3.3, 3.4, 3.5sec. Using the 3D torque data, within one month, the tendency of the athlete to generate out-of-plane, non-contributory force was reduced - push time lag reduced from 0.1sec to 0.05sec maximum. With athlete B, using soft gloves (taped leather gloves) generated a torque of 16.5Nm and push length of 203 degrees, compared to 19Nm and 183 degrees for hard gloves (thermoplastic construction). This indicated the need to develop 'combination' glove, to benefit from the push length of the soft glove and the power of the hard glove. With athlete C, a similar comparison of soft and hard gloves showed a reversed situation, but similar solution. With athlete D, the push length at high speed was significantly shorter (130 degrees) than would have been expected for 'good' technique (190+/-15 degrees) - a major rework of the athlete's technique was prescribed, in order to obtain significant improvements in pushing efficiency and top end speed.

CONCLUSIONS: Results from these case studies show the potential benefits to be gained by the measurement of power (and the use of tools, such as the Powerwheel) in wheelchair racing. The data generated gives insight into a range of key parameters and significantly enhances subsequent coaching intervention.

Keyword(s): field based, power measurement, wheelchair racing, coaching intervention

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#41

Proposals for the Development of a New Way for Classification of Visually Impaired Athletes, Computer-Based with the Aid of LCD Goggles

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Introduction: The actual classification system for visually impaired athletes are going trough chances regarding reliability, replicability, and neutrality of the examiner

Purpose: This paper proposes the development of a new way for classification of visually impaired athletes, which consists in a computer based program with the aid of LCD goggles.

Methods: The test consists in a 'movie' with questions with Tumbling E's where the athlete Shaw inform the direction it is positioned signing with his hand - the answers are taken by the classifier and will generate 3 different scores (visual acuity, contrast sensibility and movements perception) in the answer sheet (that can be filed for future comparison) - these scores will be used differently for each sport, being very sport specific. The optotypes will be shown in a random order, difficulting simulation or cheating, and the tests can be repeated as many times as wanted, changing the optotypes, being impossible to memorize the test, and comparing the previous answers to detect

simulations during the exam.

Results: The development of this technology in the classification for sports for visually impaired athletes showed very positive items: 1) the use of a computer based program turned a very reliable test, without the interference of other factors, and being applied exactly the same way any place in the world; 2) The use of a 'movie' eliminated the influence of the examiner, with the exact same time for all the athletes, in the same conditions; 3) The use of a LCD goggles eliminated any variation of illumination, distances, time of exam, ambient lights; 4) The repetition of similar question inhibits cheating, because your answers must be coherent with the previous ones (in a random order); 5)The creation of a score number for each result (visual acuity, contrast sensibility and movement perception), possibility the creation of sport specific coefficients, using these scores in a very specific way for each sport (not a general result as used today); 6) Using the optotypes in a letter E shape, there's no need of a interpreter during the main part of the test, reducing any influence or misrepresentation of skills, induced by the interpreter; 7) The answer sheet can be filed for further reference and reevaluation of the athlete.

Conclusion: This proposal of a new classification system for VI athletes seems to be reliable, neutral, and replicable in any part of the world, by any VI classifier.

Keyword(s): Visually impaired athletes, classification, sport specific, blind sport, computer based classification

Acknowledgement(s): Clínica de olhos Dr Garletti - research for a better living.

#42

Patterns of Long-Term Sport Participation after a Spinal Cord Injury (SCI)

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INTRODUCTION: A growing body of evidence indicates that participation in sport enhances a number of quality of life domains. Yet, a recent estimate indicates that only 8% of persons with SCI participate in sport.

PURPOSE: To explore if differential patterns of sport participation exist in a cohort of people with SCI over an 18-month period. A second objective was to determine predictors of these patterns.

METHODS: Participants were 696 individuals (76% men, Mage=46.8±13.4, Myears-post-injury=15.2±11.1) with SCI. They completed interviews assessing time spent engaged in sport and other forms of leisure time physical activity (LTPA) at baseline, 6 months and 18 months. Theory of Planned Behaviour variables such as attitudes and intentions to engage in LTPA, as well as other psychosocial indicators such as self-efficacy. A latent class analysis was built to determine the underlying classes for sport participation within the cohort.

RESULTS: Three latent classes emerged: (1) individuals who were not involved in sport across all time points ('no sport' n=510); those who were involved in sport at baseline but the amount of time spent decreased across 18 months ('decreased sport'; n=129); and those whose participation in sport increased at least once during 18 months ('active sport'; n=47). Mode of mobility (β) power chair=-0.8; p=0.002) and intentions (β) itentions=0.2; p=0.05) to engage in LTPA predicted assignment to the 'decreased sport' class. Manual chair users and those with higher intentions were more likely to belong to the 'decreased sport' class than to the 'no sport' class. Mode of mobility (β) power chair=-0.8; p=0.000) and intentions (β) intentions=0.2; p=0.003) also predicted 'active sport' class assignment compared to the 'no sport' class. Manual chair users and those with higher intentions were also more likely to end up in the 'active sport' class than the 'no sport' class. None of the demographic or psychosocial variables were able to predict who would belong to the 'decreased sport' as opposed to the 'active sport' class.

CONCLUSIONS: Few individuals with SCI engage in sport and even fewer maintain this rate of sport participation over the long term. Elite and competitive development resources should focus on persons in manual chairs and those with higher intentions to participate in LTPA given that they are more likely to continue participating in sport over the long term. Future research is needed to understand which factors contribute to an athlete's decision to leave sport. This knowledge is essential to understanding how to provide the best support for continued sport participation for athletes with SCI.

Keyword(s): Spinal cord injury, sport participation, latent class analysis

Acknowledgement(s): Supported by an Operating Grant and New Investigator Award from the Canadian Institutes of Health Research (grant no. MOP 57778)

#44

A Stakeholder Evaluation of Evidence-Informed Physical Activity Guidelines for Adults with Spinal Cord Injury

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INTRODUCTION: Recently, a number of countries and international organizations developed or revised their physical activity guidelines for the general population. During this process, the lack of appropriate physical activity guidelines for people with a mobility impairment was recognized as a gap area. In the absence of guidelines, only limited information is available for prescribing physical activity for adults with a mobility impairment. To begin to address this gap, our team of researchers and stakeholders (e.g., athletes, health professionals) undertook a rigorous process to develop evidence-informed physical activity guidelines for adults with spinal cord injury (SCI). According to an internationally recognized protocol for guideline development (AGREE II), obtaining stakeholder feedback is critical in guideline development.

PURPOSE: The purpose of this study was to conduct a stakeholder evaluation of newly developed physical activity guideline for adults with SCI.

METHOD: Participants were 16 consumers with SCI (81% male; Mage= 44.9 years

±11.8; Myears post- injury=18.8±14.2, 75% paraplegia) and 44 health and fitness practitioners (e.g., physiotherapists, iologists) who work with clients with SCI. Participants completed a web- or paper-based survey. They rated whether the guidelines were realistic, appropriate, feasible, useful, and informative on a 7-point scale (1=stongly disagree; 7 = strongly agree). Participants also provide suggestions for improving the guidelines.

RESULTS: Overall, respondents rated the guidelines positively. All but one item ('Does the guideline provide practitioners with clear instructions about the intensity level?') had a mean rating at the scale mid-point of '4' or higher. Consumers with SCI were confident that they could meet the guidelines, M= 6.25±1.13, and practitioners indicated that they would use the guidelines, M=5.14±1.68. A MANOVA comparing consumers' and practitioners' responses was significant, F(7, 48) 3.72, p=.003. Post hoc ANOVA revealed that consumers considered the guideline more realistic and clear than the practitioners, ps<.05. Participants suggested including additional details to clarify terms and types of activities to meet the guidelines. The guidelines were revised according to this feedback.

CONCLUSION: Stakeholders were integral in the development of new evidence-informed physical activity guidelines for people with SCI. These guidelines have important implications for promoting physical activity.

Keyword(s): physical activity guideline, prescription, practitioner, spinal cord injury

Acknowledgement(s): Rick Hansen Institute, Social Sciences & Humanities Research Council of Canada, Canadian Institutes of Health Research New Investigator Award; Ontario Neurotrauma Foundation

#45

Eligibility and Classification of Athletes with Intellectual Disabilities

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Within the Paralympic Movement, the future direction in classification of athletes with a disability is to institute more sport focused systems, with an emphasis on scientific evidence of activity limitations resulting from impairment within specific sports (Tweedy & Vanlandewijck, 2010; IPC, 2007). After a 9 year suspension of INAS-FID (the International Sports Federation for Persons with Intellectual Disability) from all IPC activities, the General Assembly of the IPC recently decided to re-include athletes with ID into the Paralympic Games under the condition that the relationship between deficits in intellectual functioning and activity limitations in the specific sport is demonstrated. This implied the urgent need for sport specific systems accounting for the affects of the underlying impairment.

Therefore, a research project was initiated within our department in cooperation with several partner universities (see affiliations) to identify the components of intelligence that play a role in sport (i.e. Sport Intelligence) and link them to the components of sports proficiency that require intelligence (e.g. decision making).

To assess a player's generic sport intelligence, a cognitive test has been developed, based on the conceptual model of Intelligence (Carroll, 1993). The test consists of 7 parts (table 1: reaction time, visual search, Corsi memory, TOL executive function, matrix reasoning, block design and finger tapping) and is a combination of a computer based touch screen application and paper and pencil tests. The 7th part (finger tapping) is a control test for motor abilities.

Table 1: Composition of the Generic Sport Intelligence Test

	NAME		feature	factors
1	Reaction Time (RT)	simple RT	keybord	processing speed/visual perception
		complex RT	keybord	
2	Visual search (VS)	simple VS	touch screen	
		complex VS	touch screen	
3	CORSI		touch screen	memory & learning
4	Tower of London		touch screen	executive functioning
5	Matrix Reasoning		paper and pencil	fluid intelligence/visual perception
6	Block design		paper and pencil	fluid intelligence/visual perception/processing speed/visuo motor abilities
7	Finger Tapping	control test	keybord	visuo motor abilities

To have the classification system for athletes with ID ready, valid, reliable and operational for the Paralympic Games in 2012, a considerable amount of test development and piloting has already been done (and is still ongoing). Over 500 athletes with Intellectual Disabilities were tested until now. The 4 targeted sports were swimming, athletics, table tennis and basketball. During the presentation, each single test will be explained and visually demonstrated and some relevant up to date results will be presented in detail.

Keyword(s): classification, intellectual disabilities, cognitive test

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#46

Development of a Field Test for Measuring Aerobic Capacity in Paralympic Goalball Athletes

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INTRODUCTION: Goalball is a sport played by athletes with visual impairment. As for all athletes, establishing testing standards to assess general and sport-specific fitness is essential. The Beep Test is a standardized test used by a wide variety of sighted athletes, with normative values that correlate with VO2max, however is not suitable for testing of visually impaired athletes.

PURPOSE: To determine the correlation between a standardized bicycle ergometer

test and a modified beep test as measures of aerobic capacity in elite goalball athletes.

METHODS: Following informed consent, demographic data were collected and athletes (n = 9, female Paralympic goalball athletes) were randomly assigned to start with one of two aerobic capacity tests: bicycle ergometer or modified beep test (developed by US and Canadian National Team coaches). The beep test involved performance of multiple rounds of shuttle-type running tasks specific to goalball with progressively shorter time intervals to complete each round (standardized with a pre-recorded CD). Each athlete wore goggles to eliminate visual feedback and simulate game conditions. The athlete started at Level 12 (12 sec intervals) and performed a sequence of movements ten times: standing at wing line, defensive position on floor, up and forward to overthrow line, backwards to goal line, forward to wing line, repeat with next beep. The time interval of each subsequent round was decreased by 1 sec, continuing until athlete failed to return to wing line within the specified time for 2 consecutive trials or when athlete voluntarily stopped. For the bicycle ergometer test athletes were hooked up to a metabolic cart (ParvoMedics) and performed an incremental test (60 rpm) with workload increases of 0.25 kp each min to volitional fatigue. Athletes had at least 24 hours rest between tests.

RESULTS: Seven of the nine athletes completed the tests: age = 22.7 ± 6.6 yrs; height = 165.7 ± 5.3 cm; body mass = 66.6 ± 10.9 kg; body fat (BOD POD) = 27.8 ± 6.3%. Final beep test level ranged from 8.3 to 10.2. Average number of beep test rounds completed was 35.1 ± 7.8. Average VO2max on the bicycle ergometer was 34.7 ± 7.5 ml/kg/min. The regression equation was calculated as: Bike VO2max = 3.466 + (0.91 * Number of Beep Test Rounds). Correlation between tests was 0.77 (SPSS 17.0).

CONCLUSIONS: The correlation obtained in this preliminary study reveals a strong relationship between the two tests. Although data collection is ongoing to increase sample size, the current results suggest the potential to capitalize on benefits of the beep test (increased efficiency, minimal equipment) for aerobic capacity testing of visually impaired athletes.

Keyword(s): blind, visually impaired, cardiovascular endurance

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#47

Developing a Match Analysis and Feedback System to Paralympic Table Tennis

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Different kinds of match analysis and feedback systems are widely used by coaches and athletes in many ball games. Match analyses are mostly conducted by using different software and the feedback is provided using videos and prints. The purpose of this presentation is to introduce a match analysis and feedback system developed for the Finnish Paralympic Table Tennis Team.

The matches of Finnish Paralympic Table Tennis Team players and their opponents are recorded by using digital video cameras. The match analyses are conducted by using Data Volley® -software based on the videos. Data Volley® is originally developed for analyzing volleyball, but the analysis methods were adapted for table tennis. The core

elements of any analysis system; player, position and action were coded and the time of every action is updated for later technical and tactical evaluation. Every stroke of both players in a match is analyzed in a specific way. Serves, serve returns and points scoring strokes are coded with special attention. Also a live analysis system with limited input has been developed due to the need of quick information during tournament situations.

The feedback from the matches is provided using 1) printouts from Data Volley® and 2) a video montage is done by using Data Video System® -software. The printouts include the paths and results of the serves, forehand and backhand strokes separately in numbers and figures. The video montage is edited as follows: 1) the match video is transferred to the computer, 2) the match analysis is synchronized to the video and 3) selected clips (serve, serve return, winning strokes, and losing strokes) from the specific player are chosen and edited semi automatically utilizing the time coding of the match analysis.

Finnish Paralympic Table Tennis Team has been using this system since spring 2006 and so far over 100 matches from different players have been analyzed. Based on these analyses montages from 50 different players have been delivered to the coach and players, who have found this to be a useful tool in developing match performance and match preparation. Similar systems have been developed in KIHU - Research Institute for Olympic Sports for other Paralympic sports such as goalball, quad rugby and sitting volleyball.

Keyword(s): Paralympic table tennis, match analysis, feedback system

Acknowledgement(s): Funding from the Finnish Paralympic Committee.

#48

Time Analysis of Elite Ice Sledge Hockey in Paralympics 2010

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INTRODUCTION: Time analysis gives important information about a sport for the coaches about the sport and helps them to plan training. To our knowledge there is no published time analysis research in ice sledge hockey.

PURPOSE: The aim of this study was to make a time analysis from ice sledge hockey and identify the differences between successful and less successful teams based on the matches of Paralympics 2010.

METHODS: Data from 123 players was collected to describe the average total playing time (TPT) and time on ice per shift (TIS). The data of these variables is based on the match reports (N=20) from the official web site of the 2010 Paralympic Games. Also 8 final matches were recorded to make more precise match and time analysis. A t-test for independent samples was applied to make the comparisons between 1) the winning (WT) and losing teams (LT), 2) the teams 1 to 4 (C1) to teams 5 to 8 (C2) in the final

ranking and 3) between forwards (F) and defensemen (D). Significance level was set at 0.05.

RESULTS: The average total duration of the 8 final matches (intermissions excluded) was 73 min 28 s ± 6 min 14 s and one period 24 min 29 s ± 3 min 44 s. The calculated work/rest rate was approximately 1:1.6. MinTPT was 8 seconds and maxTPT 45 minutes. TPT of most players (77 %) varied from 11 to 30 min. The most typical TPT was 21 to 25 min and 8 players played almost the full time. The players of C2 played significantly more than the players of C1 (22 min 59 s ± 11 min 42 s vs. 18 min 41 s ± 8 min 29 s; $p<0.05$). The examination of TPT in different player roles revealed that on average D played more than F (23 min 30 s ± 11 min 0 s vs. 18 min 30 s ± 9 min 24 s ; $p<0.01$). MinTIS was 4 seconds and maxTIS 15 minutes. Most players (78 %) played 1 min to 1 min 45 s per shift. There was a difference in TIS between C1 and C2 (1 min 24 s ± 1 min 9 s vs. 2 min 49 s ± 3 min 7 s; $p<0.001$). The average duration of TIS was also longer for LT than WT, but the difference was only close to statistical significance (1 min 44 s ± 1min 2 s vs. 2 min 24 s ± 3 min 10 s; $p=0,07$).

CONCLUSIONS: The players of C2 played more and longer shifts than the players of C1. Partly this can be explained by the number of the players in a team and by the differences in performance levels between the players. Also C1 had more players than C2. Furthermore, the performance levels of players in successful teams might also be more equal. It might also be possible that with longer shifts players get fatigued and their concentration and performance is impaired.

Keyword(s): ice sledge hockey, time analysis

Acknowledgement(s): Funding from the Finnish Paralympic Committee. This study was an officially recognized research project of the IPC in Vancouver Paralympics 2010.

#49

Sleep Quality Evaluation, Chronotype, Sleepiness and Anxiety of Paralympic Brazilian Athletes: Beijing 2008 Paralympic Games

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INTRODUCTION: the sleep is an activity that occupies about a third of our lives and it is fundamental for a good mental and emotional health, besides presenting essential importance in the maintenance of a healthy life. Still, there are few studies on the sleep of Paralympics athletes, indicating a gap that points the need of an intervention professional to identify the influence of that variable associated to the conditions of the deficiency, seeking like this to potentiate the athlete's best characteristics.

PURPOSE: The objective of this study was to evaluate the sleep quality, sleepiness, chronotype and the anxiety level of Brazilian Paralympics athletes before the 2008 Beijing Paralympic Games.

METHODS: This study was developed in the Exercise and Psychobiology Studies Center (CEPE) and Universidade Federal de São Paulo, an urban city in Brazil. A total of 27 paralympics athletes of both genders (16 men and 11 women) with an average age of 28±6 years who practice athletics (track and field events) were evaluated. Sleep quality was evaluated using the Pittsburgh Scale and the Epworth Sleepiness Scale to evaluate sleepiness. Chronotype was determined by the Horne and Östberg questionnaire and anxiety through the State-Trait Anxiety Inventory (STAI). The evaluations were performed in Brazil ten days before the competition.

RESULTS: Our results demonstrate that 83.3% of the athletes that presented excessive daytime sleepiness also had poor sleep quality. We noted that 71.4% were classified into the morning type, and 72% of the athletes that presented a medium anxiety level also presented poor sleep quality. Athletes with poor sleep quality showed significantly lower sleep efficiency (p=0.0119) and greater sleep latency (p=0.0068) than athletes with good sleep quality. Athletes that presented excessive daytime sleepiness presented lower sleep efficiency compared to non-sleepy athletes (p=0.0241). CONCLUSIONS: We conclude that the majority of athletes presented poor sleep quality before the competition. This information should be taken into consideration whenever possible when scheduling rest, training and competition times.

Keyword(s): Keywords: Sleep, Chronotype, Sleepiness, Anxiety, Athletes

Acknowledgement(s): AFIP, FAPESP (CEPID #98/14303-3 to S.T.); Brazilian Paralympic Academy - Brazilian Paralympics Committee; FADA - UNIFESP; CEPE; CEMSA.

#50

Balance Mechanisms In Early And Late Stage Blind Paralympic Football Players

Oliver Davies (Great Britain Bliond Football Team; Kings College London; Charing Cross Hospital Department of Neuro-otology; Scottish Institute of Sport.)

The control of human balance depends upon the integration of information from various sensory modalities including the vestibular, sensorimotor and visual systems. Previous studies have explored the effect of visual impairment on balance mechanisms and if visual function can be replaced by other sensory information. Early and late stage blindness has been investigated in brain imagery studies with notable differences found, however the functional implications in terms of balance control from the remaining sensory systems remains unknown. We assessed postural sway differences with and without an added proprioceptive stimulus alongside vestibular function in 3 early stage blind and 3 late stage blind athletes, comparing them with 6 healthy sighted individuals. Postural sway analysis showed early blind individuals to sway more from the trunk than sighted subjects (P=≤0.05) but not late blind subjects (P=≥0.05). In response to an added proprioceptive stimulus age of blindness onset affects the angular trunk sway in terms of pitch amplitude, with early blind individuals swaying more from the trunk than late stage blind individuals (P=≤0.05). No significant differences in vestibular perception were observed between the groups. Our findings propose that the control of an upright posture in the blind population is affected by age of blindness, particularly in response to additional proprioceptive information. Vestibular function appears to be unaffected by age of blindness, however further questions are asked regarding prior

extensive physical activity which may influence this.

Keyword(s): Blind Football, Postural Sway, Vestibular Control, Balance Mechanisms. Elite paralympic athletes.

Acknowledgement(s): Professor Adolfo Bronstein; Department of Neuro-otology Charing Cross Hospital Reserach Unit; Marousa Pavloua.

#52

Psychological Distress Profiles of Elite Athletes with Disabilities; Clinical Use of the Kessler Psychological Distress Scale (K10)

S.Ferreira; W.Derman (Department Sport Science, Stellenbosch University, Stellenbosch, South Africa; MRC/UCT Research Unit for Sports Science & Sports Medicine & IOC Research Unit for Injury Prevention and Protection of Health of the Athlete.)

INTRODUCTION: The impact of anxiety and depression on athletic performance and sports injury has been well documented in the general sporting population. However, little research exists regarding these influences in elite athletes with disability. The K10 is a short instrument consisting of only 10 questions, and highlights these clinical symptoms.

PURPOSE: The purpose of this study was to measure the K10 distress profiles of elite athletes with disability both prior to and after competition and compare them to a control group.

METHODS: Informed consent was obtained from 25 South African athletes (with varying physical disabilities), competing at the IPC Athletics World Championships, 2011. Athletes completed the K10 instrument after arrival & prior to competition (PRE); and again the day after the closing ceremony (POST). Results were also compared to K10 scores from a control group of 159 ultra distance able-bodied triathletes measured prior to competition (CON)

RESULTS: The mean score PRE was 18.9 ± 7.4 units (Range 8-40) but decreased after competition to 16.1 ± 5.2 units (Range 9-30; $P<0.05$ PRE vs. POST). PRE scores were higher than those of CON (18.9 ± 7.4 vs. 16.8 ± 4.3; $P<0.05$ PRE vs. CON). However, following competition, the differences between groups were not apparent.

CONCLUSIONS: The results of this pilot study suggest that (i) use of the K10 instrument allows for clinical identification of higher psychological distress prior to competition and; (ii) is sensitive to detect lower psychological distress experienced after competition. Furthermore (iii) higher psychological distress was apparent in PRE group relative to controls and might be due to factors including international travel and the nature of disability.

Keyword(s): Elite athletes, Disabilities, Anxiety or Depressive disorder, K10.

Acknowledgement(s): This study was made possible through the assistance of SASCOC and SASAPD.

#53

Profile of Medical and Injury Consultations of Team South Africa (SA) During The Paralympic Games of Beijing 2008

W.Derman; K.Subban (MRC/UCT Research Unit for Sports Science & Sports Medicine & IOC Research Unit for Injury Prevention and Protection of Health of the Athlete)

INTRODUCTION: Whilst many studies exist which document the injuries and illnesses of travelling able- bodied teams to multi-coded sports events, there is a scarcity of studies reporting these data in athletes with disability. Furthermore medical conditions have for the most part not been reported.

PURPOSE: This descriptive study was undertaken to report the illness and injury profiles sustained by the athletes and officials of the SA Team at the Beijing Games and to provide data for planning future events.

METHODS: Total number of consultations and diagnoses were ascertained during retrospective review of medical logs and patient files which were completed daily by the members of the medical team. Acute and chronic soft tissue (muscle strain, ligament sprain, tendon injury, contusion or laceration) and bony injury were analysed in terms of nature of injury and the grading of severity.

RESULTS: A total of 148 medical consultations were logged. 84% of consultations were from athletes and 16% from officials. Injury accounted for 33% of all consultations and illness accounted for 77% of all consultations.The most common medical complaints were ENT and respiratory system related (44%), dermatological (22%), neurological (12%), & GIT related (11%), whilst the remaining 11% of consultations were related to other systems. The most common acute and chronic injuries were soft tissue injuries. 82% of acute injuries were grade I and 18% were grade II injuries.

CONCLUSIONS: The results of this study suggest (i) Illness forms a significant portion of the medical assessment and treatment time of the medical staff accompanying a team to multi-coded events; (ii) Respiratory & ENT conditions form the single largest medical category; (iii) The profiles of illness and injury during travel of Paralympic athletes are comparable to those of Olympic athletes; (V) The above data should be useful for planning medical services for future multi-coded events.

Keyword(s): Injury profile, Illness profile, Disability

Acknowledgement(s): This study was made possible through the assistance of SASCOC and SASAPD.

#54

Body Fat Reduction in an Athlete with Cerebral Palsy - A Case Study

E Broad (Sports Nutrition, Australian Institute of Sport, Canberra, Australia)

A 32 year old female thrower with cerebral palsy (F36 - spastic dystonic) presented requesting assistance with body fat loss following several years of stable body mass. At time of initial consultation, was working full time, completing a PhD, training and had a body mass 92.65 kg, height 158 cm, waist girth 116 cm. Premature menopause diagnosed at 18 yr, on hormone replacement therapy (Premia 5 continuous).

On initial consultation, a food diary undertaken revealed an energy intake of 3700-4500 kJ/d, compared to an estimated energy expenditure greater than 11000 kJ/d. A plan to undertake progressive increases in energy intake was begun, commencing around 6000 kJ. After one week, the athlete reported return of hunger for breakfast and reduced fatigue in the afternoons. At 6 weeks, waist girth had decreased to 111.5 cm but body mass had remained stable around 92.7 kg, indicating an increase in lean body mass concomitant with improvements in strength resulting from a change in the strength training program. Energy intake was increased further to around 7000 kJ/d. Over the next 2 months the athlete moved location to a new training environment and experienced a change in training frequency and volume and reduction in work hours, so the dietary intake remained consistent over this period and body mass also remained stable. At times, energy intake fell however we continued to re-focus on the goal of 7000 kJ/day. After 6 months, the athlete's weight had only dropped to 91-92 kg, so an assessment of resting metabolic rate (RMR) was undertaken to achieve clarity regarding true energy expenditure. RMR was measured to be 8000 kJ/d, with a concomitant food diary indicating energy intake at 8000 kJ/d. Hence, energy intake was again increased to achieve 9000 kJ/day, which continued a moderate energy deficit factoring in exercise energy expenditure, activities of daily living, thermic effect of feeding, and impact of spasm. Regular reassessment enabled body mass to stabilise 90 -90.5kg over the next 5 months. Although the body mass loss was not as substantial as could be expected, the athlete was able to train consistently throughout this period and remained illness free.

This case study highlights the difficulties faced in estimating energy expenditure and managing body body composition expectations at the same time as optimising training capabilities, health and training adaptations. The outcomes highlight that at times, energy intake of athletes may need to be increased, rather than decreased, in order to achieve body fat reduction. Expectations for body composition change in some individuals may need to be modified according to the nature of their disability and pre-existing medical conditions.

Keyword(s): energy expenditure

#58

Evaluation of a Novel Strength Test Battery for Use in Classification in Paralympic Athletics: Reliability, Normal Performance and Relationship to Body Size

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INTRODUCTION: Manual Muscle Testing techniques are currently used in many Paralympic classification systems to assess muscle strength; however, poor reliability and validity make them unsuitable as a basis for development of evidence-based classification. Measures of strength are required which evaluate the muscle groups relevant to athletic performance and which are; reliable, precise, body size independent and as resistant to training as possible.
PURPOSE: A novel battery of multi-joint, isometric strength tests meeting the required criteria was developed. The aim of this study was to evaluate reliability, establish normal performance ranges, and determine whether normalization for body size was required.

METHODS: One hundred and eighteen non-disabled participants, 63 males and 55 females, (mean age = 23.24 yrs, SD 3.68), completed 10 strength tests developed to evaluate key muscle groups for running, throwing and wheelchair performance - five upper body tests, two trunk tests, and three lower body tests. Anthropometric measures were taken for the upper (10), and lower body (8). Multiple regression was used to evaluate whether strength and anthropometric measures were significantly related. Seventeen participants returned for a second testing session within seven days to permit evaluation of test-retest reliability.

RESULTS: Reliability was acceptable for all tests (Mean ICC=0.87). Normal performance ranges showed higher force production in upper body tests (males: 424.2N-1661.2N, females: 318.9N-899.3N) than trunk tests (males: 183N-724.8N, females: 155.6N-445.9N) and higher forces in leg extensor strength (males: 884N-2701N, females: 568.5N-1768.7N) than leg flexor strength (males: 124N-556.5N, females: 93.1N -352.7N). No single anthropometric measure was significantly related to all strength measures, however some anthropometric measures, either individually or in combination, explained more than 10% of the variance in a measure of strength. In males, chest depth, shoulder breadth and sitting height related to upper body strength and femur breadth to lower body. In females, humerus length, breadth and forearm length related to upper body strength. Normalisation exponents were calculated for each anthropometric measure/s which predicted performance in a specific test.

CONCLUSIONS: The novel strength test battery is reliable. Normal performance ranges were established, a necessary pre-requisite for meaningful interpretation of future studies in athletes with impairments. Anthropometric measures with the potential to influence the strength battery were identified and scaling exponents calculated. Studies evaluating the battery in populations of athletes with impairments of strength are now warranted.

Keyword(s): Anthropometry, isometric, normalisation

Acknowledgement(s): This project was supported by funding from the Australian Re-

search Council, the International Paralympic Committee, and the Australian Sports Commission

#59

What is the Optimal Position for Seated Throwing in Paralympic Athletics?

Sean M. Tweedy(1); Mark J. Connick(1); Brendan Burkett(2); Mark Sayers(2); Christophe Meyer (3); Yves C. Vanlandewijck(3) ((1) School of Human Movement Studies, The University of Queensland, St. Lucia, Brisbane, Queensland, Australia 4072; (2) Faculty of Science, Health and Education, University of the Sunshine Coast, Sippy Downs, QLD, Australia; (3) Faculty of Kinesiology and Rehabilitation Sciences, Katholieke Universiteit Leuven, Belgium.)

Purpose: Classification in Paralympic sport aims to minimize the impact of eligible impairment types (e.g. impaired strength or range of movement) on competition outcome, but classification methods are not evidence-based. Developing evidence-based methods for seated throwing events requires research in which athletes with varying impairments throw from the same standardized seated throwing position, permitting quantification of the impact of impairment on seated throwing performance. The aim of this study was to establish a standardized position which is known to facilitate optimal throwing performance in unimpaired participants.

Method: Using a custom-built, adjustable chair, 47 unimpaired males completed a protocol to determine their self-optimized throwing position both with a pole (seat angle, backrest height and pole position) and without a pole (seat angle and backrest height). Eighteen participants repeated the protocol to evaluate reliability. All participants completed three maximal throws from their self-optimized position with and without a pole. The mean position selected by all throwers, and the 15 best and 15 worst performers were analysed.

Results: Seat angle, backrest height and pole position were reliably selected. With a pole, the best throwers selected a mean position of 23° (seat angle), 18% sitting height (backrest) and, 84° elbow extension and 112 pelvic angle (pole position). Without a pole the best throwers selected a mean position of 32° (seat angle) and 18% (backrest). The difference between distance thrown with and without a pole was non-significant.

Conclusions: Results provide a sound indication of optimal positioning for seated throwing with and without a pole. It is not clear whether a pole provides a performance advantage. Research quantifying the impact of impairment on seated throwing from these positions is now possible.

Keyword(s): coordination, classification, overhand throwing, track and field

Acknowledgement(s):This research was supported by the Australian Research Council (grant LP0882187), the International Paralympic Committee, the Australian Sports Commission and the Australian Paralympic Committee. Sean Tweedy's work was supported by the Motor Accident Insurance Commission, Australia.

#60

Comparison of Trunk Sagittal Displacement Control in Sitting Position between Slalom Athletes with Cerebral Palsy and Controls

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(Sports Research Centre, Miguel Hernandez University of Elche, Alicante, Spain)

INTRODUCTION: Classification procedures in adapted sport are based on functional criteria which value the impact of disability in performance. The unclear delimitations of the functional profiles and lack of objective criteria to classify athletes are the weak spots of these procedures. The first step for objective criteria in the classification process is to develop valid methods to assess athletes' functional capabilities. PURPOSE: The aims of this study were to design a biomechanical test to value trunk sagittal displacement control while sitting in cerebral palsy (CP) athletes, and to use it to describe a sample of CP athletes of slalom.

METHODS: Eleven CP athletes from the 2010 Spanish Wheelchair Slalom Championship (divisions 1-4) and 10 controls without CP volunteered to take part in this study. Participants sat on a force plate placed at 1.2 m above the ground, with legs strapped together and arms crossed on the chest. From that position, the athletes moved the trunk backward as far as they could, and then returned to the starting position. The center of pressure (COP) excursion and the bilateral electromyography of rectus abdominis (RA), external oblique (EO), internal oblique (IO) and erector spinae (ES) were measured. To help in the comparison between PC athletes and controls, we recorded basal muscle activation (supine and prone). Maximal voluntary isometric contractions were performed to normalize the electromyographic signals (% MVC).

RESULTS: Anteroposterior COP amplitude displacement during the test was significantly higher in the control group than in the PC athletes (21.8±3.4 cm vs. 16.1±3.4 cm; $p<0.001$). However, although no statistical differences were found, the lateral COP amplitude displacement was higher for the PC athletes (3.6±1.3 cm vs. 2.8±1.3 cm). In the maximum hip extension, EO and ES activation levels tended to be higher for the control group (EO: 26-33% MVC vs. 14-20% MVC; ES: 9-10% MVC vs. 4-6% MVC) and the IO activation levels tended to be higher for the CP athletes (23-24% MVC vs. 16-19% MVC). These differences reached statistical significance for left EO ($p<0.01$). In addition, basal abdominal muscle activations of the PC athletes (1.6-3.3% MVC) were significantly higher ($p<0.01$) than those of the control group (0.3-0.5% MVC).

CONCLUSIONS: CP athletes showed less trunk control and different coactivation patterns than controls during sagittal trunk displacement and less ability to relax the abdominals in supine. Further research is necessary to compare these variables between different divisions of the CP-ISRA manual.

Keyword(s): Cerebral palsy, wheelchair slalom, functional classification, biomechanics.

Acknowledgement(s): Spanish Federation of Sports for Cerebral Palsy.

#61

The Science Support in Brazilian Athletics Permanent Team Program

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Paralympic Sport's development is increasingly dependent on an inter-professional work guided by scientific knowledge. In Paralympic Summer Games Athletics are a modality in greater evidence with its 166 events and more than 1000 athletes in each edition. Success in athletics performance in a highly selective environment is directly related to a structured plan embracing technical, medical, physiological and psychological aspects.

Brazilian Paralympic Committee established, in athletics modality in its Permanent National Team Program, an Athlete's Performance Project. It covered the following areas: Exercise Physiology, Psychobiology, Sport's Medicine, Nutrition and Physiotherapy. For the period of one year 25 athletes and 10 athlete's guides that participated in IPC's 2011 World Athletics Championship were followed.

The protocols applied on each of the cited areas had as major goal to provide information that would contribute on the adaptation of training charges or on the pedagogical process of the training. The access to this data by the coaches allowed a better comprehension of the physical stage of each athlete throughout an annual training cycle; thus allowing a better periodization of physical capabilities and also lesion prevention. The evaluations were realized during the Training and Evaluation Weeks (total of four weeks) and the feedback was given on the form of person-to-person meetings and/or by email; technical reports on tests results and videos. In between the Training and Evaluation Weeks the athletes sent monthly reports on field tests results and athlete's medical, physical and physiotherapies' data. They also reported on the execution of exercises protocols targeting flexibility and proprioception enhancement.

Three observational parameters were used as this Project quality control: athletics' performance, sporting lesions' incidence and scientific validation. On the first parameter Brazil's athletics moved from the 17th place in medal table in 2006 world championships to the 3rd place in 2011 world championships; on the second parameter a very low lesion incidence was observed as well as a decrease in the numbers of chronic lesions. And on the third parameter the data collected on the Brazilian Selection Team have been presented in international periodic (British Journal Sport Medicine).

Keyword(s): Athletics, evaluation training and multidisciplinary.

Acknowledgement(s): FADA - UNIFESP, CEPE, Brazilian Paralympic Committee

#62

Cross-Cultural Differences in Volunteer Motivation at Disability Sports Events: A Comparative Study of Malaysia and USA

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INTRODUCTION: In recent times sport organizations have experienced numerous challenges to attract, motivate and retain sport event volunteers. Understanding the motivation of individuals who volunteer for disability sport events is important for the continued success of these activities.

PURPOSE: Very little direct cross-cultural comparisons have been made assessing the motivations of volunteers at similar events. The present research compared the motives of volunteers at large disability sport events in Malaysia and the United States.

METHOD: Participants in the current study comprised volunteers from the 13th Malaysian Paralympiad (n=301) and the first USA National Special Olympics (n= 289). A slightly modified version of the Special Event Volunteer Motivation Scale (SEVMS) (Farrell et al., 1998) was used to determine the motivation of volunteers. The SEVMS is made up of 28 motives for volunteering at a special event. It is made up of four factors, namely purposive (doing something useful and contributing to the event and community); solidarity (social interaction and personal growth); commitment (external expectations and personal skills) and external traditions (family traditions and use of free time). Respondents were requested to rate the importance of each of the 28 items to their decision to volunteer. Responses to the questions were graded using a five- point Likert scale, ranging from 1 (not important at all) to 5 (very important). The questionnaire also included a separate section requesting demographic information of the respondents, as well as a separate set of questions inquiring if, and in what manner, the participants expected to be rewarded for volunteering at the event.

RESULTS: The top 10 rankings for all three populations were solidary and purposive motives, however there were different distributions. For the Malaysian volunteers 6 of the top 10 rankings were solidary motives and the remaining 4 were purposive, while purposive motives filled 7 of the top 10 rankings for the US volunteers. The volunteers differed substantially in their expectation to be rewarded for helping at the event. A total of 85.5% of the Malaysian volunteers expected to be rewarded, compared with only 12.9% of the US volunteers.

CONCLUSIONS: Volunteers from each country were generally motivated by altruistic (purposive) motives, however the Malaysian volunteers ranked motives related to self-improvement and gaining experience (solidary motives) higher than the US volunteers. Event organisers need to take into consideration that community involvement is a strong motivating factor and to modify their recruitment and retention strategies accordingly.

Keyword(s): volunteer, disability, sport

#63

European Disability Sport Policy: A Mapping Process Regarding Perspectives of Sport for People with a Disability in Europe

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The relationship between EU policy-making and sport is gaining momentum due to the growing convergence between sport and social areas of activity (Groll, Guett & Mittag 2008) and the Lisbon Treaty is providing the European Union with a soft competence on sport. In this regards also sport for people with disabilities becomes more important for and attracts notice to political players dealing with sport at EU level.

Citizens with disabilities represent around 10% of the population of the EU and in this regards the European Union sees disability as a rights issue and not a matter of discretion. The EU promotes active inclusion and full participation of disabled people in society, in line with the EU human rights approach to disability issues. This approach is also at the core of the UN Convention on the Rights of People with Disabilities, to which the European Community is a signatory (EC 2010).

In this regards, within the Preparatory Action on Sport in the area of intervention 'Promoting European fundamental values by encouraging Sport for Persons with Disabilities', a mapping process on existing information has been undertaken in order to provide a better account of the current state of the sector to assess perspectives of sport for people with a disability in Europe.

Besides evaluating the 'political' background of sport for people with disabilities at the European level, the applied research focused on the areas of 1) policy, 2) participation, 3) events, 4) facilities and 5) human resources in selected European countries.

The outcomes of the mapping process funded by the European Union, educe that most countries face common challenges e.g. regarding education and trained staff, improved infrastructure and support, and accessibility. Conclusions from the mapping relate to a need of 1) Collaboration at different levels and forms: Finance, knowledge, resources, good practices etc., 2) Further research and data exchange, 3) Exchange of tools, 4) Applicable policy, and 5) Investments that are required for the further development of the disability sport sector at all levels, based on impact analysis and consultation of the sector.

Keyword(s): European Disability Sport Policy

Acknowledgement(s): Funded by the European Commission.

#64

Differences in Electromechanical Delay between Cerebral Palsy Boccia Athletes

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INTRODUCTION: Classification manuals for athletes with cerebral palsy sometimes include subjective criteria to describe the functional profiles. Electromechanical delay (ED) can show apparent anomalies between myoelectric activity and body segment motion. Individuals with cerebral palsy presented different ED when compared to non-disabled people.

PURPOSE: The purpose of the present study was to know if the ED analysis in a ball dropping task could help to classify class BC1 and BC2 boccia players, according to the CP-ISRA manual. In addition, specific force production during a task of pushing and tracking a boccia ball was measured.

METHOD: Nineteen boccia players classified as BC1 (N = 10) and BC2 (N=9) participated in this study. All participants took part in a Spanish Boccia Championship. At the same time a data collection process was carried out. ED was measured as the time between the onset of the electromyographic activity from the extensor digitorum muscle and the onset of the wrist extension movement when players dropped a ball. Myoelectric activity was recorded from bipolar surface electrodes (model J&J I-410) placed centrally on the extensor digitorum over the muscle bellies halfway between the elbow and wrist. Hand movement was controlled by electrogoniometer (SMEG 330). The isometric strength of of the elbow extension and flexion muscles was measured by a dynamometer. The following variables were obtained: a) peak of force (N), b) time to peak of force (msec); c) rate force development (N*msec).

RESULTS: Significant differences between groups were obtained for the ED analysis ($t(1,18) = 2.44$; $p = 0.029$), with values of 229.11 (SD = 84.54) and 147.80 (SD = 14.99) milliseconds for the BC1 and BC2 groups respectively. Therefore, athletes classified as BC1 have shorter ED than athletes classified as BC2. No significant differences were obtained for the variables of the isometric strength.

CONCLUSIONS:There are differences in the movement control between BC1 and BC2 players, seen in the ED values. ED measuring could be a neurophysiologic variable to consider in the classification of boccia athletes despite of other variables related grip strength or throw.

Keyword(s): Boccia, Functional Classification, Electromiography

Acknowledgement(s): Spanish Federation of Sports for Cerebral Palsied

#65

Assessment of the Anthropometric and Motor Variables of the Brazilian Blind Soccer Elite Athletes

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INTRODUCTION: The Brazilian Blind Soccer Team, in the past years, has earned important results in the largest international competitions of the sport modality. The training planning has an essential role on sport success. Given its importance, the evaluation processes to training control are indispensable.

PURPOSE: To analyze the Anthropometric and the Physical Capacities Profiles of the Brazilian Blind Soccer Team athletes during the sports preparation period.

METHODS: 6 (six) male athletes of the Brazilian Blind Soccer Team were included in this study. The subjects went through 4 months of training, preparing for the World Championship. We assessed body composition and motor performance in the beginning (pre) and the end (post) of the program. For the body fat percentage (BF%), the Jackson & Pollock (1976) equation was used, the Aerobic Capacity (VO2max) was assessed through the Beep-Test and the Anaerobic Power Output (POmax) and the Fatigue Index (FI %), were evaluated through the Rast test. The statistic analysis was performed using the R-plus® 2.10.0 software. The Shapiro-Wilk test was used to verify data normality. For the normal data, the student's 't' test was used and the data that did not present normality we used the Wilcoxon test, with the significance level adopted at $p \leq 0,05$.

RESULTS: After the intervention, we observed a higher homogeneity in the group, as well as a significant decrease in the Fatigue Index, pre 44,4±8,6 and post 24,4±4,57, which is the variable responsible for determining the intense exercise tolerance level and a significant increase of VO2max, a variable that represents the aerobic resistance, which was initially 40,6±4,09 ml.kg.min, changing to 46,1±3,67 ml.kg.min.

CONCLUSIONS: Considering the results, we concluded that the planning and training were positive factors to improve physiological aspects inherent to this modality. Even though the absolute value of the Anaerobic Power Output did not suffer significant changes, the reduction of the Fatigue Index percentage and the VO2máx increase demonstrate the anaerobic and aerobic resistance improvement, which is essential for the soccer practice for blind athletes.

Keyword(s): Anthropometry, Body Composition, Blind Soccer, Paralympic Sport, Motor Performance

Acknowledgement(s): To the Brazilian Paralympic Committee and the athletes participating in this study.

#66

A Proposed Model for Grassroots Paralympic Sport Development

A. Forber-Pratt; J. Scott; J. Driscoll; M. Siebel (College of Applied Health Sciences, University of Illinois Urbana-Champaign)

According to the United Nations, it is estimated that 10% of the world's population has some type of disability and 80% of them live in developing countries (2009). There is a growing body of research that demonstrates the importance of disability sport to the health, psychosocial well-being, and identity of people with disabilities (Anderson, 2009). The impact of participation in sport is even greater in nations where stigma surrounding disability prevents full participation in society. Sport, in general, can be used as a catalyst for social change. Participation in elite sport allows for athletes from these nations to emerge as leaders and become contributing members of society.

The following presents a case study of Paralympic sport development in Ghana, highlighting barriers, challenges and successes. Fieldwork and research, with emphasis on athletics, gathered since 2002 allowed for the creation of a preliminary model for developing Paralympic sport in underrepresented nations. This model, while specific to Ghana, can be used as a guide for grassroots para-sport development worldwide. For example, while working toward the development of para-sport in Bermuda, the unique challenges and barriers seen there allowed us to codify this model and identify keys to success. These critical pieces include: high level of investment from key stakeholders, community support, and multidisciplinary collaboration among existing sport and disability agencies.

Successful implementation of the critical elements described above has far reaching implications for the development of para-sport. Just as the International Paralympic Committee envisions bringing together athletes from all corners of the world and enabling them to compete, our work embodies this same sentiment and provides a model outlining the tools to accomplish this goal.

Keyword(s): sport development, developing nation

Acknowledgement(s): Center on Health, Aging & Disability's International Disability Sport Outreach Project, Eagle Sportschairs

#67

Applications of the Situational Leadership Model to Athletic Coaching

A. Forber-Pratt (University of Illinois Urbana-Champaign)

This presentation is designed to share with participants from the perspective of an athlete, what qualities an ideal coach has and why. The intended audience are coaches and/or program developers for disabled sport programs. This presentation will focus on: 1) ways that coaches and program developers can affect athletes and 2) ways that athletes benefit from this community.
This presentation borrows from what is known from management scholars, specifically in terms of situational leadership and applies these concepts to the world of athletics. Tremendous insight can be gained by examining the literature about situational leadership to assist with the struggle coaches face in their attempts to be a star coach and to help their athletes reach their fullest potential.

From the perspective of an athlete, it is commonly accepted that there is a distinct difference between coaching a brand new athlete to a particular sport versus an Olympic/Paralympic level athlete. The approaches fundamentally must be different; in the first scenario the athlete benefits more from direct teaching of core skills and concepts required to gain competence in the sport versus a Paralympic level athlete who needs to work with the coach and have a higher level of input in goal setting, planning their training regiment and regulating themselves and the demands placed on them. It makes sense that this more laissez-faire approach would not be suitable for the majority of beginners. However, to restructure athletic coaching in terms of a continuum of beginner to expert and the environment (local level v. world stage), parallels the contributions from the field of management and leadership theory, more specifically, the situational leadership model.

Situational Leadership was a term coined by Ken Blanchard and Paul Hersey in the 1960s. The underlying premise behind this model is that different situations and followers require different leadership stylesâ€" namely one of four: directing, coaching, supporting or delegating (Hall, 2009; Johansen, 1990; Hersey & Blanchard, 1988). There is not one cure-all leadership approach for all situations; effective leaders adjust their style to match the situation. This model analyzes the relationship between leaders and followers in terms of four dimensions: task behavior, relationship behavior between the leader and the follower, and the maturity and development level of the follower (Johansen, 1990). We all have natural tendencies in our abilities as a leader or as a coach. What makes an exceptional coach is the one who is able to tailor their style to meet the needs of their athletes. This is situational leadership, or in this case, situational coaching.

Keyword(s): situational leadership, coaching, athlete perspective

#68

Football for Blind Women

G. Mayr, F. Penello, R. Ceccon, A. Dias (Urece Sports and Culture for the Blind, Urece Sports and Culture for the Blind, Urece Sports and Culture for the Blind, Urece Sports and Culture for the Blind)

This project was created to try to change a situation present at Sports for the Blind in Brazil, where the male five a side football is the best in the world, with several competitions to played during the year, while women didn't have the opportunity to practice football at all.

In this project, Urece Sports and Culture for the Blind, an association based in Rio de Janeiro, Brazil, has created the first female 5 a side football team in Brazil, who became world champion in 2009, in Germany and is currently organizing several workshops around Brazil, to further develop the sport, supporting the creation of other teams within the country.

In this project, the main goal is to have the female 5 a side football recognized as an official sport, in the same way that the male sport is, being part of the summer paralympic games. This stage is quite far away, so at the present point the biggest issue to be tackled is the gender issues in this sport.

This project in Brazil is done by the team of Urece, with support on gender-related issues from Fundo Social Elas, a Brazilian foundation that works with gender related subjects, the partnership in the beginning of the project of DBSV, German National Association of Blind People, and in the development of the workshops around Brazil, partnerships with local associations have been made, in order to reach more individuals. Marta Vieira, five times in a row FIFA's female best football player in the world has become the ambassador of this project, and it creates several media opportunities for the project, adding Marta's positive image for this project, and bringing the sponsorship of Copagaz, the main supporter of female football in Brazil, both for the blind and sighted players. This group of partners has made the project strong and with solid base for the future, bringing together a broad range of intitutional partners and Marta, the best ambassador that a project of female football could have.

The project is going on since 2009, getting into it's third year of work, where the main goal is to organize the first Brazilian national championships, bringing together all the women who participated in the workshops to make an event where it can be shown to the country that women can play any sport, and should have the right to play.

The project is being very successful, is being a big process of learning to everyone to understand the power that sports have to change gender issues, and empower these women to achieve their full potential, and with the media support, showing to the whole society that every women should have the same rights as men's, no matter their background, if they have disabilities or not, and that it has to be expanded for ther countries as well.

Keyword(s): Gender, Five a side football, blind, visually impaired, development

Acknowledgement(s): Urece Sports and Culture for the Blind, Copagaz, DBSV, America Football Club

#69

Networks of Learning in Coaching Athletes with Disabilities: The Learning Experiences and Networks of Four Paralympic Coaches

S. Taylor, P. Werthner, P. Trudel (School of Human Kinetics, Department of Health Sciences, University of Ottawa; Coaching Association of Canada)

To date, much research has been focused on how coaches learn to coach through exploration of how they learn in formal and nonformal coaching education or training courses, how they learn through informal experiences in daily life and while actively coaching, and how they learn from their athletes, other coaches, and mentors (for example, Mallett, Trudel, Lyle, & Rynne, 2009; Werthner & Trudel, 2006, 2009). Jarvis (2006) offers a theory that learning is lifelong, and occurs when an individual experiences a situation that is transformed, through thoughts, emotions, and/or actions, into knowledge, beliefs, attitudes, values, and skills. Further to Jarvis' theory that places learning in the social context, further research suggests that learning involves systems of co-participation or 'networks', in such forms as Communities of Practice, Networks of Practice, and Informal Knowledge Networks (Lave & Wenger, 1991; Wenger, 1998; Brown & Duguid, 2000; Allee, 2003).

What a person has learned throughout their life will influence how she or he experiences new learning situations, and the ways she or he will solve a coaching problem, or fill a knowledge gap or learning need. As part of a larger dissertation research study on the lives of four Canadian coaches for athletes with disabilities, the purpose of this presentation is to show how coaches for athletes with disabilities use a variety of resource persons and sources to create their own unique, dynamic and evolving 'networks of learning' in their coaching practice. Through four in-depth coaching case studies of using multiple interviews, on site observation, and further interviews with network members, unique networks of learning were presented for each coach participant. This presentation serves to broaden the scope of coach learning research, to help understand the innovative ways that coaches for athletes with a disability may develop their coaching practice.

Keyword(s): lifelong learning, networks, coaching athletes with a disability

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#72

The Role of Women in the Achievements of 2010 Guangzhou Para Asian Games

Sima Limoochi

Participation of women in sport events in not only a social right, but also a valuable opportunity that contributes to their health, raising their physical and spiritual power and strengthens their sense of belonging to the society.

The Paralympics Movement and the International Paralympics Committee (IPC) have made effective efforts to encourage women's participation in sport activities and competitions and to create good opportunities to improve their social status.

One of the objectives of the Paralympics Movement has been the development of women in all aspects up to 30% by the year 2009.

The purpose of this study was to examine the presence and role of the women in the achievements of 2010 Guangzhou Para Asian games and make an evaluation according to the preset goals of the Paralympics Movement.

The gathered data focuses on the women's presence and the number of medals they received in 2010 Guangzhou Para Asian games. The results suggest very satisfactory achievements:

- Ratio of Women Athletes to the Total Athletes: 26.38%
- Percentage of the Countries that sent Women Athletes to the Games: 87.80%
- Percentage of the Medals received by Woman Athletes: 29.80%
- Percentage of the GOLD Medals received by Woman Athletes: 30.79%

Keyword(s): Asian Games, women, achievements

#73

The Paralympic Athlete - Are Injuries All in the Game?

P.M. Pit-Grosheide, P. Van de Vliet (Medical and Scientific Department, International Paralympic Committee (IPC), Bonn, Germany)

With the increase of interest and participation in sports by athletes with a disability, exercise testing and the science of Paralympic sports has also taken a tremendous leap. Knowledge about the specific biomechanics and physiology of the athlete with a disability, legitimized classification and abstinence from performance enhancing drugs and doping, also contribute to success. Training- and coaching strategies for Paralympic athletes to perform at the most optimal level in most health protective conditions, are becoming central issues.

Despite, all present expertise, should one accept that injuries are part of the game? Is it just unfortunate that injuries occur and are they just unavoidable consequences of sports participation? And, do Paralympic athletes have a significantly greater overall risk of injury than able-bodied athletes? For sure, the functional consequences of injury in daily life may be far more severe in athletes with a physical impairment.

It is hugely important to better understand the types of injuries and risk factors for injuries sustained by Paralympic athletes competing in adapted sports at the elite level. By addressing these risk factors associated with sports injuries, both acute and overuse injuries can be reduced.

The IPC sees injury monitoring according to standardized research programmes as an integral part of an athletes sport development plan. Knowing the mechanisms of injury makes prevention programmes that specifically target the high risk factors more likely to be effective. Secondly, identification of athletes at risk may become possible. Studies using standard definitions such as the number of injuries per 1000 hours of exposure and the collection of more specific information on e.g. player availability, is becoming a new challenge. Additionally, psychological and behavioral influences of the athlete, as well as their coaches and referees are also interesting new ways to look at the top athlete as a whole and not at the injury alone.

A model, based on Van Mechelens ‘concept of incidence and etiology of sport injury’ will be presented to be able to allow for a successful Paralympic career through preventive measures based on better information and facts.
Nowadays, injury is not just a matter of bad luck any more!

Keyword(s): sport injury prevention, surveillance, Paralympic athlete

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#74

The Vancouver 2010 Paralympic Winter Games Medical Care Programme : Facts, Figures and Recommendations

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many; 2. Health, Leisure and Human Performance Research Institute, Faculty of Kinesiology and Recreation; Management, University of Manitoba, Canada; 3. Physical Medicine and Rehabilitation, University of Utah Medical School, Salt Lake City, USA; 4. Facultat Blanquerna, Universitat Ramon Llull, Barcelona, Spain; 5. Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games (VANOC) Medical Services; 6. Division of Sports Medicine, Faculty of Medicine, University of British Columbia, Canada; 7. Vancouver Costal Health Services; 8. Department of Rehabilitation Sciences, University of British Columbia)

Background: The medical care programme during Paralympic Winter Games should reflect the particular needs and necessities of Paralympic athletes and their support staff. Objective: To characterize in detail the medical encounters at the 2010 Vancouver Paralympic Winter Games in order to improve knowledge or injury and illness patterns for medical providers at future adaptive sports events.

Design: Prospective (sports) injury epidemiological study.

Setting: The data collection took place during the Vancouver 2010 Paralympic Winter Games.

Participants: Data are reported on all persons involved in the Vancouver 2010 Paralympic Winter Games that consulted VANOC Medical Services, with particular emphasis on athlete records (n=502 participating athletes).

Interventions: Systematic records were held on all medical and physical therapy consultations throughout the duration of the Games.

Main Outcome Measurements: Number of patients treated during the 2010 Vancouver Paralympic Winter Games, stratified by accreditation status, injury or illness type and services consulted

Results: At the Vancouver 2010 Paralympic Winter Games, more than 2717 medical interventions occurred for injury or illness, of whom 25% where athletes encounters (n=657). Consultations were mainly for minor injury/illness, majority of musculoskeletal nature, with only 7 hospitalizations (5 athletes) for a total of 24 inpatient days stay. 977 pharmacy prescriptions were issued, which in 7 cases were followed-up with a TUE application. Alpine Ski was responsible for over 50% of the imaging (n=333). Physical therapy interventions (n>900) primarily addressed back and shoulder structures.

Conclusions: A critical analysis of the actual findings and an efficient transfer of knowledge indicate the need for a multidisciplinary approach with other functional areas related to the organization of Paralympic (Winter) Games, as well as for the initiating of longitudinal study to gain further and in-depth knowledge on sport injuries and exercise-induced physiological reactions in Paralympic Athletes.

Keyword(s): Paralympic Winter Games, Paralympic athlete, injury surveillance,

Acknowledgement(s): We are very grateful to everybody who participated in the Sports Injury Surveillance Study.

#75

Lower Trunk Muscle Activity during Front Crawl Swimming in a Single Leg Amputee

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INTRODUCTION: Sufficient core trunk stability is needed to balance out the forces generated by the upper and lower extremities. Paralympic swimmers have found a way to balance out the incongruity in force generated by limbs and swim effectively.

PURPOSE: The purpose of this study was to examine how typical core stabilizing muscles are active during front crawl in a single leg amputee swimmer as compared to an elite triathlete.

METHOD: One above knee amputee (right) swimmer and one Olympic triathlete swum an all out 50m front crawl trial. Using wireless surface EMG units, (KINE© EMG 5 51013) activity was recorded from the right and left Erector Spinae (ES) and the right and left Rectus Abdominus (RA). The swim was also video taped from front and side view and signals synchronized.

Two strokes were analysed using Dartfish software (5.5). Swimming speed, stroke rate, relative duration of arm phases: entry-support (hand entry to shoulder-hand angle 45°), pull (arm angle 45° to 90°), push (angle 90° to 135°), exit (angle of 135° to hand exit from water), and recovery (hand exit to next hand entry) were determined. An arm coordination index was calculated as the difference in percent stroke cycle time between beginning pull of one arm to end exit of the second arm.

RESULTS: Swimming speed was comparable in the two athletes (1.58m/s amputee vs. 1.59m/s triathlete). Stroke rate was 58spm vs. 52spm. There was a 6% lag time in right and left propulsive arm movement in the single leg amputee and a 17% lag time in the triathlete. In the Paralympic swimmer, right RA showed constant activity. There was greater variability in the left RA. A reduction in left RA activity coincided with left arm angle 90°. At the same time the left leg kick started straight downward. The drop in left RA activity also occurred during the pull phase of the right arm but continued through the beginning of the push. This might be required to initiate the second left leg kick directed inward and needed to keep the trunk role in balance. In the triathlete both left and right RA activity were comparable to left RA in the amputee when his kick was directed downward. Left ES activity started at left arm entry and continued to left arm angle of 135° in the amputee coinciding with right arm water exit and above water recovery. In the triathlete ES activity was only seen during the arm exit with phase. Relative ES activity in the amputee was about 60%-40% activity- inactivity but tonly 20% on - 80% off in the triathlete even with a continuous kick.

CONCLUSION: When more swimmers are examined these results might be helpful in validating traditional testing of core stability on dry land.

Keyword(s): EMG, Core Stability, Crawl Stroke

#76

Athletes Oriented Design of Sportspecific Classification Systems

Horst Strohkendl (Faculty of SE, University of Cologne)

IPC's Constitution, Mission Statement and Vision as well as the new Classification Code provide an ethical framework and the development of a new method that is appropriate to athletes' perception on the subject of classification:

- 'To Enable Paralympic Athletes to Achieve Sporting Excellence, and Inspire and Excite the World'
- 'To enable: this is the primary role of the IPC as an organization: To create the conditions for athlete empowerment through self-determination.'
- 'To develop opportunities for women athletes and athletes with severe impair ments in sport at all levels and in all structures.'
- 'Paralympic athletes: the primary focus of the IPC's activities,…, it is the develop ment of all athletes from initiation to elite level…' (IPC-Handbook, 2003)

In 1985 `Functional classification and the self-determination of athletes' was reported as a specific concept in the classification of wheelchair basketball players at the 1st Symposium at Stoke Mandeville. To regard experienced athletes as ultimate experts in classification matters as opposed to quantifying methods of medical doctors (or scientists) prevails as an ongoing conflict of opinions to this day.
The IPC Classification Code highlights the need for the investigation of classification systems that work well. The historical development and effective simplifications in the application of the process of the wheelchair basketball player classification system is worth studying as an example for other sports. It shows in fact how athletes' competence and responsibility can amalgamate scientific information. According to Tim Nugent's philosophy the scientists encourage and assist athletes to form an appropriate classification system for their sports.

Keyword(s): Athletes' strive for excellence, Self-determination, Cooperation between athletes and scientists

Acknowledgement(s): IPC President

#79

A Functional Approach to Classifying Athletes with Severe Levels of Impairment for Powerchair Team Sports

S. Evans (FIPFA)

The sport has a 30 year history in various forms but was consolidated into the current format 7 years ago. Initially unregulated and open for anyone to play, the sport was unification of the game gave an opportunity for a system of classification to be devised. After careful consideration, negotiation and development to gain the confidence of Powerchair Football players and coaches the Powerchair Football Classification Programme is now underway.

The sport is designed for athletes who have severe impairments that negatively influence the potential for accessing other sports.

Levels of fitness, age, cognition, gender or skill, are not factors in the classification process as the main focus is on the functional performance of the presenting athlete in relation to their ability to play the sport safely.

There are two main categories athletes are placed in according to how much their impairment affects their performance in powered wheelchair. PF1 sports status relates to athletes with the highest level of impairment. PF2 have less physical restrictions but still need a powercahir to participate successfully in sport.

The assessment process is based primarily on core features of the game:

1. Sitting stability,
2. Head control.
3. Drive control,

then secondarily on;

1. Reflex responses,
2. Endurance.
3. Communication skills.

The classification system has been nurtured to the point of full adoption by the international body, however recent criticism relating to the testing procedure, and an over reliance on the skills of the classifier need to be addressed. Therefore this is an important oportunity to outline the testing schedule, and demonstate techniques that are emplyed, as well as to share and gain from the opinions of other classifiers from other sports. We believe in the skills of the classifier, but also require a standard of inter-rater reliabilty to support the decision making process.

This presentation will show that subjective as well as objective assessment is valid since it is able to communicate a greater depth of information for the classification team so that the athletes can show what they can do rather than what they cannot.

Keyword(s): Powerchair,

#80

The Challenge of Revision of the Classification System of Wheelchair Dance Sport

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The wheelchair dance sport is unique among IPC sports because its best performance

is an art form based not only on speed, strength, and coordination of movements in response to music, but also on expression, interaction, and communication of emotions and spirituality. Athletes with disabilities involving the lower limbs can benefit from joining wheelchair dance sport and enrich their lives by strengthening both body and mind. There are two forms of competition in wheelchair dance sport. Wheelchair dancers may participate in 'combi'-dance with an able-bodied (standing) partner or duo-dance for two wheelchair users together. Wheelchair dances can be categorized into Standard and Latin-American according to the music and the characteristics of the performance.

The history of wheelchair dance sport and its classification system is not long. The current classification tests were developed by Dr. Marcus Zimmer in 1992. According to the results of 5 functional tests, athletes are categorized into two classes; no matter they are joining Latin or standard, combi or duo. In the beginning the criteria of minimal disability were simple but clear, based on conditions which made dancing on two legs obviously difficult due to permanent impairment or disability.

However, with the growth of numbers of athletes, the involvement of professional dance teachers and introduction of modern training, topics are debated from time to time. The classification system thus needs to be revised, therewith adapting the current condition and future trend. Topics of clarification of minimal impairment, increment of the number of classes and qualified classifiers have been discussed in two classifier meetings in the last two years. Latin and Standard dances have been concluded as different sports. Separate classification tests and the development of new functional tests with a clear scoring system have been proposed.

The challenges of the revision not only arise from queries related to lack of scientific evidence for the rationale and measures, but also from practical conditions. Our next step is to discuss these issues with sports experts, and classifiers of other wheelchair sports. We would like to enhance this sport by this chance to increase people's interest in joining and studying wheelchair dance, so that this unique sport, already popular at all ages in some countries, can be better understood and practised all over the world.

Keyword(s): wheelchair dance sport, minimal disability, classification

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#81

Challenges Moving towards Sport Specific Classification for Athletes with a Visual Impairment. Analysis of the Actual Situation and Model Forward

B. Bittner; N. O'Donovan; P. Van de Vliet; L. de Salvia (International Paralympic Committee, Bonn, Germany)

The transition within the Paralympic Movement from medical to functional classification systems began in the 1980s. This shift was realized in the vast majority of Paralympic sports, however blind sports continue to use a medical system today. In 2007, the IPC Classification Code was signed by all International Federations, and the Code was signed to become a system that is sport-specific.

The first steps towards a new classification system for Visually Impaired athletes were made following a two- day long workshop involving worldwide experts in ophthalmology

and sport science in Bonn, Germany from 30 September to 01 October 2010. During the workshop, both short-term and long-term pathways for VI Classification were presented and analyzed.
The short term objectives mainly focused on the upgrading of current rules and regulations and processes, procedures, policies and operations to guarantee a fair, objective process of athlete assessment. Following experts' advice the IPC, together with IBSA, has revised the respective section in the IPC's Sport Classification rules and regulations.
As for the long term development of a sport specific classification system, classification of VI athletes needs to be re-reflected upon from a sport-specific approach. It will lead to modified eligibility criteria and a (potential) revision of sport classes. This process is to be initiated without further delay in consultation with current classifiers, researchers, eye-care specialists and sport experts.

This presentation will explore the current situation of VI Classification and the steps that have been made and will continue to be made towards a new model of VI Classification, based on the information presented during the VI Classification Expert Meeting in Bonn.

Keyword(s): VI Classification; sport specific

#82

Sport for Development: The Case of Paralympic Sports in the East African Region

P. Bukhala (Kenyatta University, Kenya)

Sport is not a new element in development cooperation. It has been used in an ad hoc way to reach development-related objectives as far back as the 1920s. The United Nations has used sports as a means to improve the conditions of people affected by conflicts and natural disasters for many years. Sport is also increasingly recognized as an important tool in helping the United Nations achieve its objectives, in particular the Millennium Development Goals. In Kenya the Vision 2030 manifesto endorses sport as one of the key pillars of development. Despite this recent progress, the systematic use of sport and physical activity for development in developing countries has not been well documented as there is no centralized coordination to monitor the impact of sports for persons with disabilities for development in these countries. In addition there still remains many unconvinced of the impact disability sports can have on development and humanitarian objectives.

The development of the Paralympics sports globally has ensured that sport can be enjoyed by all, including those with physical and intellectual disabilities. The Paralympic movement has been shown to have the ability to break down walls of prejudice and discrimination, while showcasing courage, motivation, empowerment and inspiration to others. The present study documents the role of Paralympic sports in the development of athletes with disabilities in the East African region in the current social, economic and ideological context of the developing nations of the world and identifies the growing number of national and international agencies and organizations using Paralympic sports in their development programming, and discusses challenges, opportunities and prospects.

Keyword(s): Paralympic sports, sports and development, millennium goals.

#83

Aerobic Fitness and Atherosclerotic Cardiovascular Risk in Paralympic Athletes with Locomotor Impairments

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INTRODUCTION: In locomotor impaired (LI) individuals, atherosclerotic cardiovascular disease (ACVD) has emerged as the leading cause of morbidity and mortality. ACVD occurs at earlier ages than in ambulatory subjects because LI individuals have a higher prevalence of risk factors (RF) (obesity,lipid disorder, metabolic syndrome, and diabetes) mainly due to their increased sedentary habits. While reduced daily energy expenditure has been established as further RF, to the best of our knowledge, the possible role of aerobic fitness as a protective factor has not been fully evaluated in these individuals.

PURPOSE: The present study, carried out on LI athletes (LIA) who competed in the last summer and winter Paralympic Games (Beijing, 2008 and Vancouver, 2010), was aimed at evaluating the hypothesis that aerobic fitness was inversely related to ACVD RF.

METHODS: A total of 70 male LIA (36 with spinal cord injury [SCI], 18 lower limb amputees, 3 with cerebral palsy, 5 with poliomyelitis and 8 with other disorders) were screened through anthropometric and blood pressure (BP) measurements, laboratory blood tests and graded maximal arm cranking exercise tests to estimate both an ACVD RF score and aerobic fitness (oxygen uptake peak - VO2peak). The ACVD risk score was assessed summing 1 point for each of the following, potentially modifiable by fitness, RF: obesity (BMI≥30 or waist circumference ≥102 cm), hypertension (systolic BP ≥140 mm Hg and diastolic BP ≥90 mm Hg), dyslipidemia (LDL cholesterol ≥130 mg•dl-1 or HDL < 40mg•dl-1), impaired fasting glucose (fasting plasma glucose ≥100 mg•dl-1) and subtracting 1 point when serum HDL cholesterol was higher than 60 mg•dl-1.

RESULTS: Prevalence of hypertension, obesity, total cholesterol, LDL cholesterol, HDL cholesterol and impaired fasting glucose were equal to 13.9% and 17.6%, 13.9% and 5.9%, 47.2% and 32.3%, 50% and 41.2%, 38.9% and 44.1%, 30.6% and 23.5%, respectively in LIA with SCI and with other impairments. Based on the number of ACVD RF, 4 groups were formed: group 1 (RF≤0, N=26), group 2 (RF=1, N=25), group 3 (RF=2, N=9), group 4 (RF=≥3, N=10). VO2peak values were equal to 36±8.8 ml•kg-1•min-1, 32±8.6 ml•kg-1•min-1, 27±5.5 ml•kg-1•min-1, 18±4.3 ml•kg-1•min-1 in group 1, group 2, group 3 and group 4, respectively.

CONCLUSIONS: ACVD risk was higher in LIA with SCI than in other LIA. VO2peak is inversely related to ACDR RF. High aerobic fitness provides a protective effect on the risk of ACVD morbidity and mortality.

Keyword(s): Oxygen uptake peak.

Acknowledgement(s): Funding from Italian Paralympic Committee and "Sapienza", University of Rome.

#84

The Relationship between Parameters of Maximal Exercise Capacity and Individual Time Trial Performance in Cyclists with Physical Disabilities

P. Boer & E. Terblanche (Department of Sport Science, Stellenbosch University)

Introduction
It is widely accepted that the anaerobic threshold (AT) is an important determinant of endurance performance in able-bodied athletes. Research has shown that cyclists perform at or even above the velocity and VO2 that is associated with the AT in real world exercise. Whether this threshold should be used as a training marker for events shorter than 40-km is questionable. This study investigated whether the physiological responses during a 20-km TT in cyclists with physical disabilities relate to their anaerobic threshold.

Methods
Seven male and two female cyclists (19± 2.3yrs; 169.6± 10.1cm; 62.3± 8.2kg) participated in the study. Subjects performed a ramped (20W/min) exercise protocol to exhaustion and a self-paced, 20-km TT on two consecutive days on the Velotron cycle ergometer. Maximal, as well as sub-maximal responses (VO2, heart rate and power output) at AT were determined for the maximal exercise test. AT was defined as the point where the R-value was equal to 1.0. The results of this test were not shared with the cyclists prior to the TT test. During the 20-km TT subjects chose their own gearing, with exercise physiologists providing assistance where needed. Subjects received visual feedback on the computer with respect to distance, speed, and cadence. Time of test and average heart rate (HR), cadence, watts, speed and cycling efficiency values were recorded.

Results
Mean values for HR and %HR max for the 20-km TT (HR- 181, %HR max- 92) were not significantly different ($p<0.01$) when compared to values at AT (HR- 180, %HR max- 93). However, the mean power output (PO) during the TT (199W± 42.4) was significantly ($P<0.01$) lower than the PO at the AT (252W± 65.1)

Conclusions
These results suggest that there is a relationship between the self-selected exercise intensity of cyclists with physical disabilities during a 20-km TT and their AT, when exercise intensity is expressed as average HR and %HR max. However, it seems that AT is not a good estimate of performance when the exercise intensity during a TT is expressed as average power output. These findings have implications when laboratory exercise test results are used for training prescription or as benchmarks for race pace.

#3

Technical Development of an Ankle Prosthetic Component as an Aid for the Lower Leg Amputee Triathlete during the Transition To and From the Swimming Event

D. Lyle (Adaptive Sports Ankle Prosthetics LLC, The Woodlands, Texas, USA)

Lower leg amputees often require the aid of personnel (handlers) to aid them during the transition at the swim event start and finish so that the prosthetic leg/foot can be disengaged/engaged respectfully. This type of assistance is time and space consuming, and degrades the confidence of the individual Lower Leg Amputee Triathlete.

The objective of the ankle prosthesis is to provide the Lower Leg Amputee Triathlete a component that allows the swimmer to walk or run from the land area into the water, transition the ankle to a swim orientation, complete the swim and without any aid from personnel walk or run out of the water onto a landing to complete the transition to the next Triathlon stage. A hand's free AquaTransition would benefit the Lower Leg Amputee Triathlete by increasing transition confidence and significantly improving the swim time and transition time performance.

The ankle prosthesis is designed for saltwater use and is internally spring loaded to allow for quick push button hands-free articulation. Plantar flexion equals the normal ankle range of motion of 50°. Ground force reaction on the foot returns the ankle to a 0° (flat) position for ambulation.

This presentation will introduce a new ankle prosthesis component believed to be a 'game changer' for the Lower Leg Amputee Triathlete and offer significant performance improvement during the swim transition.

Keyword(s): ankle, triathlon, swim, transition

Acknowledgement(s): Physical Therapy. Merck Manual Professional. November 2005.

#34

Survey of Types of Disability and Functional Classification of Athletics in Brazil

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Functional Classification that is used in all sports for people with physical disabilities in order to evaluate the potential of the athlete separating them into classes and can thus establish a fair play in competition. This study can support the work in Brazil of professionals (judges, classifiers, organizers and others) structure the organization to conduct competitions, provide technical support and training staff in accordance with the needs of each region as well as pursue other scientific investigations. Objective: to investigate through classification process what the types of disabilities found in the regions of Brazil. Methodology: The methodology consisted of 243. athletes all

practitioners of the athletics sport on field and track.. Information was collected by the team of Functional Classification of the CPB - the Brazilian Paralympic Committee. Functional classification was held during the three stages of the regional circuit Lotteries Brazil 2010 Paralympics in three regions. The evaluation was conducted from data contained the official statement of the classifiers that contained personal data, types of disabilities, testing and class.. Two surveys were conducted:

Disability Types and Functional Classification. Results: It was found that the highest percentage of disability in the north-northeast regions was poliomyelitis, in the south-central region found the most spinal cord injuries and in the central-east regions there was a similar distribution between the disabilities investigated. In all three regions, amputations and achondroplasia were at a lower rate. Regarding the Functional Classification, Class 50 had a very high percentage compared to others in all regions.

Keyword(s): Paralympic Sports, Classification process, disabilities

Acknowledgement(s): To the Brazilian Paralympic Committee - (CPB)

#43

Evidence-Informed Physical Activity Guidelines for Individuals with Spinal Cord Injury: Implications for Practice and for Other Mobility Impairment Groups

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Among people with a mobility impairment, physical activity can reduce the risk of chronic disease and secondary health problems, and improve overall quality of life. Despite these benefits, unfortunately, many people with mobility impairment are inactive. For example, in Canada it is estimated that 56% of Canadians with a mobility impairment are completely inactive (Participation and Activity Limitation Survey, 2007). This sedentary lifestyle is attributable largely to the absence of physical activity promotion initiatives for adults with a mobility impairment. Promoting physical activity is very difficult in the absence of information regarding the types, amounts, and intensities of activity that yield health and fitness benefits. Such information would assist clinicians and programmers in prescribing and promoting physical activity.

People with a mobility impairment have also indicated a desire for more information about how to exercise and be physically active. Such information is available to the able-bodied population in the form of physical activity guidelines. However, these guidelines are not necessarily appropriate for people with a mobility impairment. The rigorous development of evidence-based physical activity guidelines that are specific to the needs and capabilities of people with a mobility impairment is long overdue.

While physical activity recommendations exist for some for mobility impairment groups, these recommendations have not been underpinned by a robust, standardized guideline development process. Recognizing this gap, our team of researchers and stakeholders (e.g., consumers, health and recreation professionals, athletes) followed an internationally recognized process to develop physical activity guidelines for adults with a spinal cord injury. This same process was used to revise the Canada's Physical Activity Guidelines for the general population and underpinned the formulation of the World Health Organization's new physical activity guidelines. The spinal cord injury guidelines provide a model for developing physical activity recommendations for other mobility impairment groups.

The purpose of this presentation is to introduce the newly developed evidence-based physical activity guidelines for people with spinal cord injury and to discuss the implications of the guidelines for clinical practice and promotion of sport participation.

Keyword(s): guideline, recommendation, physical activity, exercise, sport

Acknowledgement(s): Rick Hansen Institute, Social Sciences & Humanities Research Council of Canada, Canadian Institutes of Health Research New Investigator Award; Ontario Neurotrauma Foundation

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#51

Management of Expanding Sport of the Disabled in the World

G. Ebrahimi

Disabled people are valued in special ways, specifically in the vast continent of the world, and are considered as people who could be present in social activities like other citizens. In spite of some physical limitations, they could show off their potential abilities which are sometimes even more than people who are apparently healthy. But these people need appropriate facilities and equipments which should be provided by authorities and government in order to have a successful and active presence in the society.

In many countries, sport has always been a significant factor which could bring disabled people in the society from their homes, so that they could reveal their capabilities; however in most countries sport did not receive enough attention and no measure was taken to create proper structure which is appropriate for these people. Thus, in order to reach the ideal level, a great effort must be made-especially in the vast continent of the world, and consequently, disabled people will definitely welcome sport activities and competitions much more than today.
Here are some suggestions which could be efficient:

1. Educating the families
2. Informing properly
3. Setting correct process of talent identification
4. Fortifying and expanding sport substructures
5. Creating attraction
6. Setting fair and precise rules

7. Strengthening and expanding regional bases under the supervision of IPC Extensive technical help to other countries
8. Creating and improving research centers in the world

I am sure expanding these centers will produce spectacular results in developing sport of the Disabled.

Keyword(s): disabled sport, management,

#55

Cardiovascular Responses of Wheelchair Dancers during Dance. Part 1

Kyoko Terada; Ayako Satonaka; Yasuto; Terada; Nobuharu Suzuki (Nagoya College: Nagoya University : Nagoya Keizai University: the Institute for Developmental Research)

Purpose
We showed three wheelchair dancers of different type of physical challenge. In two of them, all four limbs were severely impaired. The other one had good upper limb functions. The purpose of this study was to investigate the influence of wheelchair dance on cardiovascular responses of three challenged dancers comparing their heart rate responses to that of the dancer whose upper limb functions were not impaired.

Methods
Continuous heart rates (HRs) were measured during the Overall-5-Latin-Dances of Wheelchair Dance Japanese Championship in October, 2009. For all three participants, continuous HRs were measured during the competitions of The Wheelchair Dance World Championship in December, 2010. For case 1 and 3, continuous HRs in ordinary practice of wheelchair dance and in ordinary daily activities, and maximal oxygen uptake (VO2max) were measured.

Results
The continuous HRs of case 1 during the Overall-5-Latin-Dances reached above 170 beats/min when she performed a samba and a jibe. The averaged HRs were more than 130 beats/min. The continuous HRs of case 3 during the Overall-5-Latin-Dances reached above 180 beats/min several times. On the other hand, continuous HRs of all three participants in standard dances were significantly lower than that in Latin dances. While VO2max of case 1 was within normal range of healthy Japanese women of the same age, VO2max of case 3 were lower than that of healthy counterparts.

Conclusions
This study showed that wheel chair dances increased HRs of wheelchair dancers with severe physical challenge who used electric wheelchairs for considerably long time necessary for improvement of their aerobic fitness.
We may provide health promotion for the people with severe physical challenge introducing wheelchair dance to them, which may gradually increase the people who will participate in Paralympics.

Keyword(s): wheelchair dance; heart rates; aerobic fitness;

Acknowledgement(s): Authors are grateful for the participants of this study.

#57

Strategies for Raising Awareness about Paralympic Sport: The Positive Impact of Multidiscipline Approaches to Research and Information Sharing

J. Le Clair (Humber College Institute (LTD))

The collection and dissemination of information about Paralympic sport to athletes, sport communities, educational institutions, the general public, and governments is sometimes a challenge. This paper examines some strategies related to multidiscipline approaches that may aid in this process.

Successful organizational growth at all levels is assisted by a better understanding of the science and social context of sport. Globally there is an increading desire to learn about dis/abilty in sport at the high performance level and at the local level in the context of both recreation and sport. The general public and the media become very engaged during the Paralympic Games years, as was obvious with the 2010 Vancouver Games; however in the non-Paralympic years there is often little coverage. Researchers are impacted by this fickle attention in three ways: the popular press often generate their news stories from formal press conferences that are usually only associated with official events: funding priorities for research are pollitical in nature and influenced by the priorities of the current government and by lobby groups around
'hot' issues; and in many countries there are still few researchers who focus on dis/ability sport.

This paper discusses approaches that may assist in 'getting out' information by using a multidiscipline approach, recognizing that in many institutions and countries there may be only one or two researchers in their disability field. Strategies can include collaborative research across disciplines, mulitdiscipline submissions to journals, flexibility in accepting multidiscipline conference papes and sessions, and publishing in non-academic publications like newspapers, bulletins and blogs. The paper also presents some findings from the perspective of Paralympic athletes about their media experiences, and some suggestions about their role in this process.

Keyword(s): Paralympic sport, multidiscipline research, information sharing, media

Acknowledgement(s): Social Sciences and Humanities Research Council (SSHRC) (Canada)

#70

Comparison of Depression between Two Groups of Amputees Amputees Athletes and Amputees without Sport Activities and Role of Paralympic Movement on the Mental Health of People with Disability

Bahman Zand

Effects of sport on enhancement of human health are distinguished evidently. One of the psychological effects of disabilities is depression and encouragement of people with disability to sport activities is very important. Role of paralympic movement in establishment of sport activities is obvious. One of the most important of disabilities consequences are emotional and psychological problems and one of the most prevalent of these problems is depression. Depression not only is one of the most prevalent psychological diseases but also is one of the symptoms of the other psychological disease. In attention to billatereral role of depression in establishment of isolation and recluse and in the other hand role of isolation in formation of depression we can understand the importance of the paralympic movement in mental health of people with disabilities.

In this article depression is compared between two groups of amputees:

First one: Paralympic athletes in all branches of sport.
Second one: Amputees without sport activities.
These people (with amputation) are selected in prosthesis facility center in Iran Red Crescent community. Amputation is a sudden disability and involvement to depression after the amputation is inevitable and due to this reason depression is reviewed one year after their involvement to disabilities.
All persons are between 20-45 years old.
General Statistical survey is done without concentration to sexuality.
Method of research is descriptive statistical analysis and statistical details are working out from researcher made questionnaire.

Results of research:Results of the survey are shown that sport in national level can reduce the risk of depression involvement between the people with disability (and Amputees) obviously.

Details of statistical survey are shown that the range of this reduction is high other statistical details are in the article and there are some attractive points in various comparisons.

Importance of research: Role of the Olympic & Paralympic movement in human health is shown generally. But special effects of the sport on.

Keyword(s): depression - Paralympic Movement - Amputee-- psychological health - sport activities

#71

Survey of Exceptional Student Perception (Visual Impairment or Physical Disabilities) Regarding to Paralympic Movement Underline Iran - NPC Activities

Bahman zand, Zahra Yousefi

Today young & juniors like to active & Joy thus recognition of attraction and special motivation of them is one of the most important duties of communities. Physical education is one of the numerous branches of human science and can help them to gain access to sport because most of the basic goals & objects of general education are cached at playing & sport field. Most of the researchers and studies in the worldwide can show us that the people with disability with help of sport not only will earn their self confidence, self steam & recovery but also they can reveal their worthiness and abilities. They can also participate in social activities.

In General, sport can change the unusual reflections and reveal the worthiness and abilities of the people with disabilities.

Object:
The objectives of this survey are description of paralympic movement & introduce the paralympic sports and also junior & young disabled recognition to Iran's NPC activities in two parts:
1-Championship games
2- sport for all

* Importance of this review:
- Requirement to sport and effects of sport in recovery and health of people with disabilities.
- Importance of sport as the best factor for independency and presence of people with disability in community.
- Produce of proper situations for disabled persons to more participate in sport.
-The level of attention & attraction of young students & juniors to paralympic movement & National Paralympic Committee activities

Method of Research:
In this article descriptive statistic analysis is used and statistic findings are working out from researcher made questionnaire.

Conclusion:
The results of the research are shown that: Organizing and celebration of paralympic days in 4 recent years by Iran - NPC and presence of exceptional students in it is shown that these students will like to participate in successful paralympic sport branches in Iran.

Keyword(s): Exceptional students, locomotor Disability, Visual impairment, paralympic movement, Sport activities, people with disabilities

#77

'Kepruk Banyu' Indonesian Traditional Games as Efforts in Approach to Adapted Physical Activity in the Inclusive School

Sri Sumartiningsih (Semarang state university)

PURPOSE
The purpose of this study was to develop a traditional game 'kepruk banyu' good for all children with special
needs as well as normal.

METHODS
This study uses survey and qualitative descriptive, because it describes the existing conditions, researchers only need a little conditioning according to the desired state.

RESULTS
Based on survey results found that the traditional game 'Kepruk banyu' always to be held on Indonesia Independence day. Not only for normal children, adults and even older but also for people with special needs. Basic movement exercises that can be done is: 1) a balance, that is setting one side against another side to pressure balance the body cope with gravity. 2) Warping of flexion, extension, abduction, adduction, inversion circumduction or use all the dimensions of motion at each joint. 3) Bringing the expense related to the armed muscle groups t.4) Crawl is a pattern of motion that turns the use of hands and feet from the lying to moving.5) Hitting the contact with the hand against an external object. 6) Build the raised center of gravity. 7) Run that is moving forward, causing the lying phase 8) Stop intertia body is overcome when moving into the break. 9) swing the spinning motion is sustained body movement around body.10) Touching the tactile stimulation of the hand lets sort out the size of the object, the size and shape of the object. 11) Walk the removal of body movement continuously with body position erect attitude. Composed of the swing phase, the foot contacts the support and encouragement that body for directional linear coherent. 12) Reaching the conduct of thrust upwards against the object is required to balance so that the object is not in vertical movement.

CONCLUSIONS
Motion is the absolute right of each human being, whether normal or persons who are unable to move. expected to play a person can maintain his physical fitness activity and motion.Traditional game 'Kepruk banyu' as an Indonesian national culture, should continue to be developed and cultivated, although the more modern games traditional games are not be forgotten.

Keyword(s): kepruk banyu, activity, disability

Acknowledgement(s): all participants

#78

The Effect of Breaststroke Swimming Exercise to Increase the Value of Peak Expiratory Flow (APE)

Sri Sumartiningsih, Anies Setiowati (Semarang State University)

Purpose:
The purpose of this study is to investigate the influence of breaststroke swimming exercise to improving the peak expiratory flow.

Methode:
This study used 17 students of men aged 19-21 years, APE values measured before and after the study. Style swimming workout done in accordance with a program that has been made.

Result:
Value of peak expiratory flow in male students obtained on average before exercise (530 ± 15 811) liters / min and after doing the exercises (540.59 ± 17 092) liters / minute. Paired t-test showed t = -6.446 and p = 0.000, which means there are differences in peak expiratory flow values before and after exercise swimming breaststroke.

Conclusion:
The conclusion is the breaststroke swimming exercise can be improving of peak expiratory flow.

Keyword(s): breaststroke, exercise, peak expiratory flow value

Acknowledgement(s): Semarang swimming organisasion

VISTA2011 Scientific Conference
Scientific Information

Proceedings

There will be no formal proceedings published for this Conference.

Abstracts of papers presented at the VISTA2011 Scientific Conference are published in this booklet and are also available on the registration website (www.paralympic.org/events).

Presentation Information

- **Free Communications**

  Presentations will run for a maximum of 15 minutes, to allow 5 minutes for questions and discussion.

  Speakers should upload their presentations (PowerPoint format for Windows only) in the Speaker Ready Room at least 5 hours before the allotted presentation time. Files should not exceed 1,5 GB.

  Supported media for transferring presentations are: USB storage devices, DVD Roms, CD Roms, or memory cards.

  Configuration: Windows X, Microsoft Office 2007 SP1 or previous version, Windows Media Player 11 or previous.

  All presentations will be in English. Translation services will not be available.

- **Poster Session**

  Presenters may set up their posters in the VISTA Foyer from 12:00 on Friday 2 September.

  Presenters will be available for a poster discussion session in the VISTA Foyer on Friday 2 September between 13:30 and 17:00.

Certificate of Attendance

A certificate of attendance will be provided.

VISTA2011 Scientific Conference
General Information

Admission

Participant name badges will be provided at the registration desk. All participants are requested to wear their badge throughout the Conference.

Electricity

The standard voltage in Germany is 220 V.

Insurance

Conference registration does not include insurance. Participants are advised to arrange their own insurance cover prior to departure.

Language

The official language of the Conference is English. Translation services will not be provided.

Meals

Lunch and coffee breaks are included in the registration fee during the three days of the Conference.

Breakfast and dinner are included in the room rate at the GSI, if booked directly through the IPC.

Please note that separate registration is required for the Closing Banquet on 3 September.

Registration Desk

The registration desk, located in the VISTA Foyer, will open on Wednesday 31 August at 12:00 and stay open throughout the Conference during the following hours:

Wednesday 31 August:	12:00 to 22:00
Thursday 1 September:	10:00 to 18:20
Friday 2 September:	10:00 to 18:20
Saturday 3 September:	10:00 to 18:20

Website

www.paralympic.org/events

VISTA2011 Scientific Conference
Social Events

WEDNESDAY 31 AUGUST 2011

18:00-20:00
Haus der Geschichte

Opening Ceremony*

Welcome address hosted by the Lord Mayor of Bonn
Bus transfers will be provided to/from the GSI

SATURDAY 3 SEPTEMBER 2011

19:30-22:30
Poseidon Rhine Cruise

Closing Banquet, with Paralympic Scientific Award Gala**

Gala dinner along the Rhine (further information provided on the next page)
Bus transfers will be provided to/from the GSI

*included in the conference registration fee
**separate registration required

POSEIDON BOAT CRUISE ON THE RIVER RHINE

A boat cruise down the River Rhine has been organized by the International Paralympic Committee as the closing event for participants of the VISTA2011 Scientific Conference.

This special event will take place on the evening of **3 September from 19:30 to approximately 22:30.** The cost per person is **€ 30**, and includes the **3 hour cruise and a buffet-style meal.** A cash bar will be available for beverage purchases.

Enjoy this enchanting trip down the River Rhine with colleagues and new friends made during the VISTA2011 Scientific Conference.

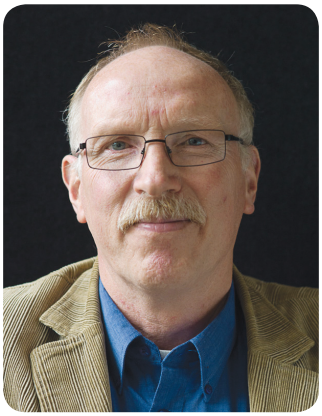
The River Rhine is one of longest rivers in Europe, stretching 1,233km through Germany. Relax as you cruise down the river and take in the beautiful scenery of Rhineland and spot along the banks the mighty fortresses, palaces and ancient homes. As the river winds it way through, observe how the river nurtures the grapes of countless vineyards and small farms.

On the cruise, a delicious typical Rhineland buffet will be served, including well known German dishes as for example “Halver Hahn” (a special cheese sandwich served on a fresh roll), “Mettwürstchen” (minced pork sausage), “Rheinischer Sauerbraten” (typical Rhineland pot roast), “Kartoffelsalat mit Speck und Zwiebeln” (potato salad with bacon and onions) and “Waldgrütze mit Vanillesoße” (mixed fruit with vanilla sauce) etc.

Please note that the Poseidon only seats 150 people and therefore availability is on a first-come-first-serve basis. Please enquire at the VISTA registration desk for further information and booking.

VISTA2011 Scientific Conference
Paralympic Scientific Award Winner

Congratulations to



Prof. Lucas van der Woude

Prof. Lucas van der Woude has been elected as the recipient of the International Paralympic Committee's prestigious Paralympic Scientific Award for 2011.

As a kinesiology professor at the University of Groningen in the Netherlands, van der Woude is the programme leader of a Dutch grant that supports a study regarding the restoration of mobility during the rehabilitation of those patients with spinal cord injuries.

He is affiliated with Rehabilitation Amsterdam and is an active member of the research institute, MOVE, an organization run by the VU University Amsterdam that aims to optimize human movement through excellent scientific research.

His main interests are in the physiology, biomechanics and ergonomics of upper-body arm work within the context of rehabilitation and technology.

Prof. Lucas van der Woude will receive his award at the Award Gala during the Poseidon Rhine Cruise on 3 September.

Previous Paralympic Scientific Award Recipients:

2009 – Gudrun Doll-Tepper (GER)
2007 – Garry Wheeler (GBR/CAN)
2005 – Colin Higgs (CAN)

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