The Past, Present and Future of Paralympic Sports Medicine

Professor Nick Webborn OBE

University of Brighton
WHERE HAVE WE COME FROM?
The Mandeville Legacy
No. of Countries participating in Paralympic Games - Rome to Rio
No. of Countries participating in Paralympic Games - Rome to Rio

Still 22 Countries With NOC but no NPC
No. of Athletes participating in Paralympic Games - Rome to Rio

No. of Athletes

<table>
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</thead>
<tbody>
<tr>
<td>No.</td>
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<td>700</td>
<td>1100</td>
<td>1300</td>
<td>1500</td>
<td>1700</td>
<td>1900</td>
<td>2100</td>
<td>2300</td>
<td>2500</td>
<td>2700</td>
<td>2900</td>
<td>3100</td>
<td>3300</td>
</tr>
</tbody>
</table>
Evolution of Diversity and Inclusion in the Paralympic Games

1960 – Rome SCI only

Gradual inclusion of different impairment types

• 1976 - VI & Amputees
• 1980 – CP & Les Autres
• 1996 – Intellectual disability

Male : Female Ratio 60:40
Sports Science Classification
Ft Lt Anthony Webborn

Medical Officer

duties as fitting helmets and harnesses for aircrew, as well as deciding when a man is fit enough to fly. The RAF is geared to flying and it is his task to get everyone as fit as possible and as quickly as possible. One of two doctors on the station, Ft Lt Webborn is on call every other night, every other weekend and whenever there is flying. Compensation for this is the time the job gives him to study for the exam he needs if he is to graduate to surgery. Although his own goal is...
1992

Prof John King
Course Director

Sports and Exercise Medicine (SEM) has been taught at Queen Mary for many years, with the post-graduate MSc programme being the oldest in Europe, and possibly the world. Graduates go on to include SEM in their clinical practice as a sub-speciality, for example in general practice, orthopaedics, rheumatology or emergency medicine, or more directly via specialist training in SEM. SEM was finally recognised as a speciality in the run-up to the London 2012 games, with many SEM graduates from QMUL playing critical roles in the games and now the legacy delivery.
From the Games

Paralympics – Barcelona 1992

John Reynolds MB BS, MRCP(UK), Angela Stirk Grad Dip Phys Ed MCSP, Austin Thomas RGN RCNT RNT, BEd and Fiona Geary Grad Dip Phys MCSP
British Paralympic Association, Croydon, Surrey, UK
Medicine – Rehabilitation
Sports Medicine – Athlete Care
1992 – Challenges for a young sports physician

- Desire to apply principles of Sports Medicine to the Para athlete
- Very limited literature base
- Funding limited
- Small practitioner base
Sports Medicine Approach

• Know your athletes
• Anticipate the potential problems of your athletes
• Introduce prevention strategies
Paralympic Sports Medicine Specialty Components

- Injury/Illness Prevention & Management
- Cardiovascular Risk Bone Health
- Sport Specific Issues
- Environmental Medicine
- Event Medicine & Emergencies
- Long term Consequences of Sport
- Children Women Older
- Anti-Doping & Boosting
- Team Care
- Impairment Specific Issues
- Equipment Injury & Biomechanics
- Travel Medicine
No. of Articles in PubMed Disability Sport / Paralympic - up to 1992

Pub Med Articles by Year

Total 9
Sports for the physically disabled

The 1976 Olympiad (Toronto)

ROBERT W. JACKSON, * M.D., M.S. (TOR.), F.R.C.S.(C), AND ALIX FREDRICKSON, † B.A.,
Toronto, Ontario, Canada

From the Division of Orthopaedic Surgery, Toronto Western Hospital, Toronto, Ontario, Canada

ABSTRACT
The 1976 Olympiad for the Physically Disabled was the first olympiad with full competition for blind, paralyzed, and amputee athletes. More than 1,500 from 38 countries took part in wheelchair (12 events), blind (8 events), and amputee (11 events) games. Participants were classified by an international team of doctors. The athletes were accommodated in university residences with small infirmaries. A school near the games site was used as a field hospital. Rest areas were also set up. Volunteers served on the medical staff (three doctors, three nurses, three receptionists, and three physical therapists on each of two shifts per day). In addition doctors, nurses, trainers, and physical therapists rotated around various venues at the games site. Physicians treated 285 patients (184 were athletes; others were spectators) for a variety of problems, physical therapists treated 119 athletes, and trainers treated 114 athletes. Contingency plans in case of mass disaster were made but were not needed. Disabled athletes are slightly more vulnerable to stress and fatigue than able-bodied athletes. The Toronto games will probably be remembered as the turning point in the emergence of sports for the disabled from a purely rehabilitation measure to a true sporting event in its own right.

handling of spinal cord injuries caused by that holocaust, 80% of paraplegics were dead within 3 years from the complications of paraplegia. Sir Ludwig Guttmann, through his work with spinal injuries, was largely responsible for reversing those statistics. He showed that if a paraplegic is well nursed in the early stages and pressure sores and kidney infections are avoided, the individual can eventually learn to look after himself. Now, 80% of paraplegics have a normal life expectancy. Sir Ludwig was knighted in 1966 for his basic contribution to the care and well-being of this group of seriously disabled persons. He is proud of the role he played in transforming people who were previously welfare recipients, into tax-paying citizens and social contributors.

Sir Ludwig must also be given credit for realizing the advantage of sport in the rehabilitation of persons who are paralyzed from trauma or disease.

THE BEGINNING
The first international sporting event for paralyzed persons took place in 1952 at Stoke Mandeville Hospital in England, the home of the National Spinal Injuries Centre directed by Sir Ludwig Guttmann. On that occasion, a team of Dutch archers, all former servicemen and servicewomen, competed
1984/1985

Kathleen A. Curtis, PT, Ph.D.
Former Dean, College of Health Sciences
University of Texas at El Paso
Dr Mike Ferrara
Dean, College of Health and Human Services
University of New Hampshire

1992

Paraplegia
Injuries to Elite Wheelchair Athletes

The injury experience of the competitive athlete with a disability: prevention implications

The injury experience and training history of the competitive skier with a disability
Paralympic Sports Medicine Specialty Components

- Sport Specific Issues
- Impairment Specific Issues

- ‘Wheelchair athletes’
- Spinal cord injury
“What Do You Mean, A Wheelchair Athlete?”

Nick Webborn, MBBS, FACSM

The term “wheelchair athlete” evolved as a term as sports in wheelchairs developed and became more prominent. However, as we look forward to the largest Paralympic Games ever in London in 2012, is this term still valid? With more than 4,000 athletes participating in 20 different sports with a variety of impairment types, it has become evident that, in terms of understanding patterns of injury or illness, this generic term is misleading.

One can imagine a member of a three-man crew who uses a wheelchair in daily living. An archer with multiple sclerosis perhaps might use a wheelchair for daily ambulation but will sit on a stool to undertake his or her sport. One could continue similarly with examples for more established Paralympic sports like table tennis, equestrian dressage, or shooting, but new sports continue to evolve, such as rowing, introduced in Beijing in 2008 with fixed-seat rowing for wheelchair users. One can
Heat-related problems for the Paralympic Games, Atlanta 1996

Occasional pieces

Fifty years of competitive sport for athletes with disabilities: 1948–1998

AD Webborn

"Boosting" performance in disability sport

...Original articles "Boosting" performance in disability sport. | Sussex Centre for Sport and Exercise Medicine. | Journal Article | Autonomic Nervous System physiopathology | Blood Pressure physiology......
No. of Articles in PubMed Disability Sport / Paralympic 1977 - 2000

Total 35
IPC Medical Committee 2001

Dr Michael Riding
CMO IPC

Dr Toni Pascual
Anti-Doping
Sports Injury Prevention

1. Establishing the extent of the problem:
   Incidence
   Severity

2. Establishing the aetiology and mechanism of sports injury

3. Introducing a preventive measure

2002

Dr Stuart Willick
Associate Professor, Physical Medicine & Rehabilitation,
University of Utah School of Medicine

Injuries among Disabled Athletes during the 2002 Winter Paralympic Games

NICK WEBBORN¹,², STUART WILICK³, and JONATHAN C. REESER⁴

¹International Paralympic Committee, Bonn, GERMANY; ²University of Brighton, East Sussex, UNITED KINGDOM;
³University of Utah, Salt Lake City, UT; and ⁴Department of Physical Medicine and Rehabilitation, Marshfield Clinic, Marshfield, WI
Salt Lake Injury Survey
Salt Lake Injury Survey

First interaction with Sport International Federation re: injury prevention and regulations
Issues of Exercise in the Heat for Paralympians are the Same
Performance Limitation & Heat Illness
Cooling strategies improve intermittent sprint performance in the heat of athletes with tetraplegia

N Webborn,¹,² M J Price,³ P Castle,¹ V L Goosey-Tolfrey²,⁴

¹Chelsea School Research Centre, University of Brighton, Eastbourne, UK
²British Paralympic Association, London, UK
³School of Science and the Environment, Coventry University, Coventry, UK
⁴School of Sport and Exercise Sciences, Loughborough University, Loughborough, UK

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nickwebborn@sportswise.org.uk

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Published Online First
14 June 2008
Pill Temperature during the ISP

* All conditions significantly different from each other (p<0.01)
Time to Exhaustion

* significantly greater than Control (p<0.05)
Heat acclimation improves intermittent sprinting in the heat but additional pre-cooling offers no further ergogenic effect

Paul Castle, Richard W. Mackenzie, Neil Maxwell, Anthony D.J. Webborn & Peter W. Watt

Eur J Appl Physiol
DOI 10.1007/s00421-012-2417-6

ORIGINAL ARTICLE

Partial heat acclimation of athletes with spinal cord lesion

Paul C. Castle · B. Pasan Kularatne · John Brewer · Alexis R. Mauger · Ross A. Austen · James A. Tuttle · Nick Sculthorpe · Richard W. Mackenzie · Neil S. Maxwell · Anthony D. J. Webborn
Athens 2004
Athens 2004
Torino 2006 and Vancouver 2010

Dr Carolyn Emery
University of Calgary

Dr Anne Allen
Wilmington NC
The Injury Experience at the 2010 Winter Paralympic Games

Nick Webborn, MBBS,*† Stuart Willick, MD,‡ and Carolyn A. Emery, PT, PhD§∥

Objective: The objective of this study was to examine incidence proportion and the characteristics of athlete injuries sustained during the 2010 Vancouver Paralympic Games.

Design: Descriptive epidemiological study.

Setting: All medical venues at the 2010 Vancouver Paralympic Games, Canada.

Participants: A total of 505 athletes from 44 National Paralympic Committees participating in the 2010 Vancouver Winter Paralympic Games.

Assessment of Risk Factors: Baseline covariates included sport specificity (ie, ice sledge hockey, alpine skiing, Nordic skiing, wheelchair curling), gender, age, and disability classification.

for musculoskeletal complaints were generated in 34% of all sledge hockey athletes, 22% of alpine ski racers, 19% of Nordic skiers, and 18% of wheelchair curling athletes.

Conclusions: The Injury Surveillance System identified sport injuries in 24% of all athletes participating in the 2010 Winter Paralympic Games. The injury risk was significantly higher than during the 2002 (9.4%) and 2006 (8.4%) Winter Paralympic Games. This may reflect improved data collection systems but also highlights the high risk of acute injury in alpine skiing and ice sledge hockey at Paralympic Games. These data will assist future Organizing Committees with the delivery of medical care to athletes with a disability and guide future injury prevention research.

Key Words: athletic injury, Paralympic sport, epidemiology

Sports Injury Prevention Para Ice hockey
IPC INJURY AND ILLNESS PREVENTION STUDY

LONDON 2012 PARALYMPIC GAMES
The epidemiology of injuries at the London 2012 Paralympic Games

Stuart E Willick,¹,² Nick Webborn,³ Carolyn Emery,⁴ Cheri A Blauwet,¹,⁵ Pia Pit-Grosheide,¹ Jaap Stomphorst,¹ Peter Van de Vliet,⁶ Norma Angelica Patino Marques,¹,⁷ J Oriol Martinez-Ferrer,¹,⁸ Esmè Jordaan,⁹ Wayne Derman,¹,¹⁰ Martin Schwellnus¹⁰

Br J Sports Med Published Online First
doi:10.1136/bjsports-2013-092374
Illness and injury in athletes during the competition period at the London 2012 Paralympic Games: development and implementation of a web-based surveillance system (WEB-IISS) for team medical staff

Wayne Derman,1,2 Martin Schwellnus,1,2 Esme Jordaan,3 Cheri A Blauuet,4,5 Carolyn Emery,6,7 Pia Pit-Grosheide,5 Norma-Angelica Patino Marques,5,8 Oriol Martinez-Ferrer,5,9 Jaap Stomphorst,5,10 Peter Van de Vliet,5,11 Nick Webborn,12 Stuart E Willick5,13

Factors associated with illness in athletes participating in the London 2012 Paralympic Games: a prospective cohort study involving 49 910 athlete-days

Martin Schwellnus,1,2 Wayne Derman,1,2 Esme Jordaan,3 Cheri A Blauuet,4,5 Carolyn Emery,6,7 Pia Pit-Grosheide,5 Norma-Angelica Patino Marques,8,5 Oriol Martinez-Ferrer,5,9 Jaap Stomphorst,10,5 Peter Van de Vliet,5,11 Nick Webborn,12 Stuart E Willick,5,13
IPC Winter Injury Surveys

Salt Lake 2002

Torino 2006

Vancouver 2010

Sochi 2014

Pyeongchang 2018

Injuries Among Disabled Athletes During the 2002 Winter Paralympic Games

NICK WEBBORN1,2, STUART WILICK3, and JONATHAN C. REESER4

1Member, Medical Commission, International Paralympic Committee, Bonn, Germany and 2University of Brighton, East Sussex, England. 3University of Utah, Salt Lake City, UT, and 4Department of Physical Medicine and Rehabilitation, Marshfield Clinic, Marshfield, WI

MEDICAL AND SCIENTIFIC NEWS

IPC Injury Survey Torino 2006

The Injury Experience at the 2010 Winter Paralympic Games

Nick Webborn, MBBS,*† Stuart Willick, MD,‡ and Carolyn A. Emery, PT, PhD§¶

High incidence of injury at the Sochi 2014 Winter Paralympic Games: a prospective cohort study of 6564 athlete days

W Derman,1,2,3 M P Schwellus,2,3,4 E Jordaan,5 P Runciman,1 P Van de Vliet,6 C Blauwet,7 N Webborn,8 S Willick,9 J Stomphorst10

High incidence of injuries at the Pyeongchang 2018 Paralympic Winter Games: a prospective cohort study of 6804 athlete days
IPC Summer Injury & Illness Surveys

The epidemiology of injuries at the London 2012 Paralympic Games
Stuart E Willick,1,2 Nick Webborn,3 Carolyn Emery,4 Cheri A Blauwet,1,5 Pia Pit-Grosheide,1 Jaap Stomphorst,1 Peter Van de Vliet,6 Norma Angelica Patino Marques,1,7 J Oriol Martinez-Ferrer,1,8 Esmè Jordaan,9 Wayne Derman,1,10 Martin Schwellnus10

High precompetition injury rate dominates the injury profile at the Rio 2016 Summer Paralympic Games: a prospective cohort study of 51 198 athlete days
Wayne Derman,1,2 Phoebe Runciman,1,2 Martin Schwellnus,2,3 Esme Jordaan,4 Cheri Blauwet,5 Nick Webborn,6 Jan Lexell,7,8,9 Peter van de Vliet,10 Yetsa Tuakli-Wosornu,11 James Kissick,12 Jaap Stomphorst13

Watch this Space
### Injury rate by sport – London 2012

<table>
<thead>
<tr>
<th>Sport</th>
<th>Total number of Injuries (percentage of total number of injuries)</th>
<th>Number of athletes with an injury</th>
<th>Total number of athletes competing</th>
<th>Total number of athlete days</th>
<th>Proportion of athletes with an injury</th>
<th>Injury incidence rate: number of injuries/1000 athlete days (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>510 (100%)</td>
<td>441</td>
<td>3657</td>
<td>51 198</td>
<td>12.1</td>
<td>10.0 (9.1 to 10.9)</td>
</tr>
<tr>
<td>Football 5-a-side</td>
<td>22 (4.3%)</td>
<td>17</td>
<td>70</td>
<td>980</td>
<td>24.3</td>
<td>22.5 (14.8 to 34.1)*</td>
</tr>
<tr>
<td>Wheelchair fencing</td>
<td>16 (3.1%)</td>
<td>13</td>
<td>72</td>
<td>1008</td>
<td>18.1</td>
<td>15.9 (9.7 to 25.9)</td>
</tr>
<tr>
<td>Judo</td>
<td>25 (4.9%)</td>
<td>19</td>
<td>115</td>
<td>1610</td>
<td>16.5</td>
<td>15.5 (10.5 to 23.0)*</td>
</tr>
<tr>
<td>Football 7-a-side</td>
<td>24 (4.7%)</td>
<td>21</td>
<td>112</td>
<td>1568</td>
<td>18.8</td>
<td>15.3 (10.3 to 22.8)*</td>
</tr>
<tr>
<td>Wheelchair rugby</td>
<td>20 (3.9%)</td>
<td>16</td>
<td>96</td>
<td>1344</td>
<td>16.7</td>
<td>14.9 (9.6 to 23.1)</td>
</tr>
<tr>
<td>Wheelchair basketball</td>
<td>41 (8.0%)</td>
<td>32</td>
<td>228</td>
<td>3192</td>
<td>14.0</td>
<td>12.8 (9.5 to 17.4)</td>
</tr>
<tr>
<td>Sitting volleyball</td>
<td>21 (4.1%)</td>
<td>17</td>
<td>127</td>
<td>1778</td>
<td>13.4</td>
<td>11.8 (7.7 to 18.1)</td>
</tr>
<tr>
<td>Wheelchair tennis</td>
<td>15 (2.9%)</td>
<td>13</td>
<td>131</td>
<td>1316</td>
<td>13.8</td>
<td>11.4 (6.9 to 18.9)</td>
</tr>
<tr>
<td>Para powerlifting</td>
<td>22 (4.3%)</td>
<td>22</td>
<td>141</td>
<td>1974</td>
<td>15.6</td>
<td>11.1 (7.3 to 16.9)</td>
</tr>
<tr>
<td>Para athletics</td>
<td>126 (24.7%)</td>
<td>111</td>
<td>894</td>
<td>12 516</td>
<td>12.4</td>
<td>10.1 (8.5 to 12.0)</td>
</tr>
<tr>
<td>Archery</td>
<td>16 (3.1%)</td>
<td>14</td>
<td>113</td>
<td>1582</td>
<td>12.4</td>
<td>10.1 (6.2 to 16.5)</td>
</tr>
<tr>
<td>Triathlon</td>
<td>8 (1.6%)</td>
<td>7</td>
<td>58</td>
<td>812</td>
<td>12.1</td>
<td>9.9 (4.9 to 19.7)</td>
</tr>
<tr>
<td>Canoe</td>
<td>7 (1.4%)</td>
<td>6</td>
<td>52</td>
<td>728</td>
<td>11.5</td>
<td>9.6 (4.6 to 20.2)</td>
</tr>
<tr>
<td>Table tennis</td>
<td>27 (5.3%)</td>
<td>24</td>
<td>223</td>
<td>3122</td>
<td>10.8</td>
<td>8.6 (5.9 to 12.6)</td>
</tr>
<tr>
<td>Sailing</td>
<td>9 (1.8%)</td>
<td>8</td>
<td>76</td>
<td>1064</td>
<td>10.5</td>
<td>8.5 (4.4 to 16.3)</td>
</tr>
<tr>
<td>Rowing</td>
<td>9 (1.8%)</td>
<td>8</td>
<td>88</td>
<td>1232</td>
<td>9.1</td>
<td>7.3 (3.8 to 14.0)</td>
</tr>
<tr>
<td>Para swimming</td>
<td>49 (9.6%)</td>
<td>42</td>
<td>492</td>
<td>6888</td>
<td>8.5</td>
<td>7.1 (5.4 to 9.4)†</td>
</tr>
<tr>
<td>Cycling (track and road)</td>
<td>20 (3.9%)</td>
<td>20</td>
<td>204</td>
<td>2856</td>
<td>9.8</td>
<td>7.0 (4.5 to 10.9)</td>
</tr>
<tr>
<td>Equestrian</td>
<td>7 (1.4%)</td>
<td>7</td>
<td>71</td>
<td>994</td>
<td>9.9</td>
<td>7.0 (3.4 to 14.8)</td>
</tr>
<tr>
<td>Shooting Para sport</td>
<td>12 (2.4%)</td>
<td>11</td>
<td>130</td>
<td>1820</td>
<td>8.5</td>
<td>6.6 (3.7 to 11.6)</td>
</tr>
<tr>
<td>Goalball</td>
<td>8 (1.6%)</td>
<td>7</td>
<td>102</td>
<td>1428</td>
<td>6.9</td>
<td>5.6 (2.8 to 11.2)</td>
</tr>
<tr>
<td>Boccia</td>
<td>6 (1.2%)</td>
<td>6</td>
<td>99</td>
<td>1386</td>
<td>6.1</td>
<td>4.3 (1.9 to 9.6)†</td>
</tr>
</tbody>
</table>
Injury rate by sport – London 2012
General Risk Factors Paralympians

• Tend to be older than Olympians – London 2012 Mean age 30 (12-67)
• Co-morbidities from medical conditions
• Manual wheelchair use independent risk factor for upper limb injury
## Incidence rate of illnesses

<table>
<thead>
<tr>
<th>System</th>
<th>Competition period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Respiratory</td>
<td>138</td>
</tr>
<tr>
<td>Skin and subcutaneous tissue</td>
<td>91</td>
</tr>
<tr>
<td>Digestive</td>
<td>74</td>
</tr>
<tr>
<td>Nervous system</td>
<td>44</td>
</tr>
<tr>
<td>Genitourinary</td>
<td>38</td>
</tr>
<tr>
<td>Ears and mastoid</td>
<td>32</td>
</tr>
</tbody>
</table>

Incidence rate of illnesses

<table>
<thead>
<tr>
<th>System</th>
<th>N</th>
<th>IR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory</td>
<td>138</td>
<td>3.52 (2.96 to 4.16)</td>
</tr>
<tr>
<td>Skin and subcutaneous tissue</td>
<td>91</td>
<td>2.32 (1.87 to 2.85)</td>
</tr>
<tr>
<td>Digestive</td>
<td>74</td>
<td>1.89 (1.48 to 2.37)</td>
</tr>
<tr>
<td>Nervous system</td>
<td>44</td>
<td>1.12 (0.82 to 1.51)</td>
</tr>
<tr>
<td>Genitourinary</td>
<td>38</td>
<td>0.97 (0.69 to 1.33)</td>
</tr>
<tr>
<td>Ears and mastoid</td>
<td>32</td>
<td>0.82 (0.56 to 1.15)</td>
</tr>
</tbody>
</table>

Different to Olympians

### Incidence of Illness

<table>
<thead>
<tr>
<th></th>
<th>Summer Olympics</th>
<th>Summer Paralympics</th>
<th>Winter Paralympics</th>
<th>Winter Olympics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illness proportion (%)</td>
<td>7</td>
<td>15.1</td>
<td>17.4</td>
<td>8</td>
</tr>
<tr>
<td>Illness rate (/1000 athlete days)</td>
<td>5.2</td>
<td>13.2</td>
<td>18.7</td>
<td>5</td>
</tr>
</tbody>
</table>
Illness in impairment classes
(385 illnesses on WEB-IISS)

- Skin and subcutaneous illnesses
- Spinal cord injured (46.7%)
- Amputation/limb deficiency (31%)
- Urinary tract infection – Spinal cord injured (77.4%)
Skin and Subcutaneous Tissue
Is daily walking when living in the Paralympic village different to the typical home environment?

Brendan Burkett

**ABSTRACT**

**Background**  Life within the Paralympic village is exciting, and the preparation for competition of utmost importance. Due to the sheer geographic size of the Paralympic village and associated competition venues, the amount of incidental walking could be different to an athlete’s home environment, and any extra walking could potentially diminish athletic performance.

Swimming has been an official sport at the Paralympic Games since the inaugural 1960 Rome games. To be eligible to compete at the Paralympic Games, athletes with disabilities are grouped into classes that are defined by the degree of function present in their disability. Swimmers with physical (locomotor) disabilities are placed into one of 10 classes (S1–S10) according to their ability to
Is daily walking when living in the Paralympic village different to the typical home environment?

Brendan Burkett

Additional 5472 steps / day when at a Paralympic Games (83% increase over normal day)
Urinary Tract Infection

• Commonest cause of disabling infection in SCI athletes
• ‘Hero to Zero’ in hours
• Education –
  • Hydration
  • Hand hygiene

Hand hygiene is very important for prevention of urinary tract infection for susceptible athletes. Transfer of bacteria from the ground, to your trahicathet, to your hands and to your catheter can occur very easily. Always carefully wash or use disinfectant gels prior to catheterisation and afterwards. Make plenty of supplies of your usual equipment and bring any usual antibiotics you may be able to give you intravenous antibiotics to tackle the infection as quickly as possible.
focus
Injury – Areas of Focus

- Head Injury
- Mechanics of Injury
- Upper Limb Injuries
“Biomechanics is everything”  
Yves Vanlandewijck

Injury related to the Mechanics of Sport
To determine which structures will be damaged, and how to prevent injury, it is essential to understand:

• The Sport
• The Impairment type
• The Impairment level

And understand the biomechanical differences
Different Sports – Different Uses – Different Chairs

Different Design = Different Pushing Techniques & Different Sport Demands = Different Mechanical Loads
Different Sports – Different Uses – Different Chairs
Different Sports – Different Uses – Different Chairs
Different Sports – Different Uses – Different Chairs
Different Sports – Different Uses – Different Chairs

Different Design = Different Pushing Techniques & Different Sport Demands = Different Mechanical Loads
Injury rate by sport – London 2012
Injury Mechanism FB5
Mechanism of Acute Injury in Competition

- 7/8 injuries - contact with other athletes
- 5 out of 8 (62.5%) were reported as relating to foul play and contact with other athlete.
Collecting Concussion Data

Real-time Data

NPC Team Physician

Assist Clinical Decision Making

IPC Research Team

Collate info on Impacts and Risk

Wearable Technology Implanted in head protection

GFT™ IMPACTS

GFT™ RESEARCH
Collecting Concussion Data

- Linear Acceleration (g)
- Rotational Velocity (°/s)
- Head Impact Criteria (HIC)
- Gadd Severity Impact (GSI)

Threshold Impacts (12)

- RIGHT
- LEFT
- BACK
- FRONT

GFT™ IMPACTS

RESET VIEW
Integration of Innovative Materials and Sport Specific Design
Integration of Innovative Materials and Sport Specific Design

• D30 - rate-sensitive, soft, flexible materials with high shock absorbing properties

• Based on non-Newtonian principles, molecules flow freely, but on impact, lock together to dissipate impact energy and reduce transmitted force.
Carlo Rovelli

“Science is an acute awareness of the extent of our ignorance”
Integration into International Sport Regulations

• Engagement with IF regarding head protection trials
• Consider mandatory implementation
• Referee, player and coach education
• Longitudinal study to assess effect
Heads up on concussion in para sport

Nick Webborn,1,2 Cheri A Blauwet,1,3
Wayne Derman,1,4,5 Guzel Idrisova,1,6 Jan Lexell,1,7 Jaap Stomphorst,1,8
Yetsa A Tuakli-Wosornu,1,3 James Kissick1,9

Concussion in Para Sport

James Kissick, MD, CCFP (SEM), Dip Sport Med1,*,
Vick Webborn, MB BS, FFSEM, MSc2

KEYWORDS
- Concussion • Para sport • Para athlete • Athletes with a disability • Injury

KEY POINTS
- Para athletes are exposed to concussion risk, particularly in speed, collision, and contact sports.
- There are few incidence data on concussion in Para athletes.
- Current assessment guidelines and tools (eg, Sport Concussion Assessment Tool—5th Edition) are not applicable to some Para athlete populations.
- The management of concussion in the Para athletes may need to be adapted depending on the athlete impairment and sport.
- Risk reduction strategies, in particular education, must be implemented.
# Head Injury and Concussion Risk

<table>
<thead>
<tr>
<th>Summer Sports</th>
<th>Impairment</th>
<th>Collision Potential</th>
<th>Impact Speed</th>
<th>Head Protection</th>
<th>Risk Rating</th>
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<tbody>
<tr>
<td>Archery</td>
<td>Multiple</td>
<td>Very low</td>
<td>Very low</td>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>Bocci</td>
<td>CP</td>
<td>Very low</td>
<td>Very low</td>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>Cycling road</td>
<td>Handcycle</td>
<td>Moderate</td>
<td>High</td>
<td>Yes</td>
<td>5</td>
</tr>
<tr>
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<td>Trike</td>
<td>Moderate</td>
<td>Moderate-High</td>
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<td>3</td>
</tr>
<tr>
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<td>Bike</td>
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</tr>
<tr>
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<td>Moderate</td>
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<td>3</td>
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<td>Multiple</td>
<td>Low</td>
<td>Moderate</td>
<td>Yes</td>
<td>2</td>
</tr>
<tr>
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<td>VI</td>
<td>High</td>
<td>Low</td>
<td>No</td>
<td>4</td>
</tr>
<tr>
<td>Football 7-a-side</td>
<td>CP</td>
<td>Moderate</td>
<td>Low-Moderate</td>
<td>No</td>
<td>2</td>
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<tr>
<td>Goalball</td>
<td>VI</td>
<td>Moderate</td>
<td>Moderate</td>
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<td>3</td>
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<tr>
<td>Judo</td>
<td>VI</td>
<td>Moderate</td>
<td>Moderate</td>
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<td>2</td>
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<td>Wheelchair</td>
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<td>Very low</td>
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<tr>
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<td>Moderate</td>
<td>No</td>
<td>2</td>
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<tr>
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<td>VI</td>
<td>Low</td>
<td>Moderate</td>
<td>No</td>
<td>2</td>
</tr>
<tr>
<td>Para athletics field</td>
<td>CP</td>
<td>Low</td>
<td>Moderate</td>
<td>No</td>
<td>2</td>
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<tr>
<td>Para athletics track</td>
<td>Wheelchair</td>
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<td>Moderate</td>
<td>Yes</td>
<td>3</td>
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<tr>
<td>Para athletics track</td>
<td>Amputee</td>
<td>Low</td>
<td>Moderate</td>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>Para athletics track</td>
<td>VI</td>
<td>Low</td>
<td>Moderate</td>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>Para athletics track</td>
<td>CP</td>
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<td>Moderate</td>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>Para canoe</td>
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<td>High</td>
<td>Yes</td>
<td>4</td>
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<tr>
<td>Para triathlon—run</td>
<td>Multiple</td>
<td>Low</td>
<td>Low</td>
<td>No</td>
<td>2</td>
</tr>
<tr>
<td>Para triathlon—swim</td>
<td>Multiple</td>
<td>Low</td>
<td>Low</td>
<td>No</td>
<td>2</td>
</tr>
<tr>
<td>Rowing</td>
<td>Multiple</td>
<td>Very low</td>
<td>Low</td>
<td>No</td>
<td>2</td>
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<tr>
<td>Sailing</td>
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<td>Moderate</td>
<td>No</td>
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<tr>
<td>Shooting Para sport</td>
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<td>Very low</td>
<td>Very low</td>
<td>No</td>
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<tr>
<td>Sliding volleyball</td>
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<td>Table tennis</td>
<td>Multiple</td>
<td>Low</td>
<td>Low</td>
<td>No</td>
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</tr>
<tr>
<td>Wheelchair basketball</td>
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<td>Low</td>
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</tr>
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<td>Wheelchair fencing</td>
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<td>2</td>
</tr>
<tr>
<td>Wheelchair rugby</td>
<td>SCI</td>
<td>High</td>
<td>Low</td>
<td>No</td>
<td>3</td>
</tr>
<tr>
<td>Wheelchair tennis</td>
<td>Multiple</td>
<td>Low</td>
<td>Low</td>
<td>No</td>
<td>2</td>
</tr>
</tbody>
</table>
Upper Limb Injury
Important Consequences of Upper Limb Injury

Impact on Activities of Daily Living:
• Propulsion
• Transferring – chair to bed, toilet, car
• Self-care – bladder/bowel
• Driving
INJURY RATE BY BODY PART

1. Shoulder 17.7%
2. Wrist/Hand 11.4%
3. Elbow 8.8%
4. Knee 7.9%

doi:10.1136/bjsports-2013-092374
Injury Location is Impairment/Event Specific

<table>
<thead>
<tr>
<th>Ambulant Athletes</th>
<th>Wheelchair/Seated Athletes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Thigh</td>
<td>1. Shoulder/clavicle</td>
</tr>
<tr>
<td>2. Knee</td>
<td>2. Elbow</td>
</tr>
<tr>
<td>3. Lumbar spine</td>
<td>3. Knee</td>
</tr>
<tr>
<td>4. Lower leg</td>
<td>4. Upper arm</td>
</tr>
<tr>
<td>5. Foot</td>
<td>5. Wrist</td>
</tr>
</tbody>
</table>

Lower extremity involvement

Upper extremity involvement
Injuries per 1000 athlete days - Sport v Athletics Track Wheelchair

![Graph showing injuries per 1000 athlete days with 95% CI for different sports]
## Injuries Wheelchair Athletics by Event Type

<table>
<thead>
<tr>
<th></th>
<th>Sprints</th>
<th>Long distances</th>
<th>Throws</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Athletes participating</strong></td>
<td>110</td>
<td>32</td>
<td>177</td>
</tr>
<tr>
<td>Acute Traumatic (IR)</td>
<td>6 (5.5)</td>
<td>4 (12.5)</td>
<td>18 (6.8)</td>
</tr>
<tr>
<td>Acute on Chronic (IR)</td>
<td>2 (1.8)</td>
<td>0 (0)</td>
<td>10 (4.5)</td>
</tr>
<tr>
<td>Overuse injury (IR)</td>
<td>3 (2.7)</td>
<td>0 (0)</td>
<td>14 (7.9)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>11 (10)</td>
<td>4 (12.5)</td>
<td>42 (23.7)</td>
</tr>
<tr>
<td>0-1 days missed (IR)</td>
<td>9 (8.2)</td>
<td>3 (9.4)</td>
<td>32 (14.7)</td>
</tr>
<tr>
<td>&gt; 1 day missed (IR)</td>
<td>2 (1.8)</td>
<td>1 (3.1)</td>
<td>10 (4.5)</td>
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</tr>
</tbody>
</table>
Injuries/1000 athlete days - Sport v Athletics Field Wheelchair
## Top 5 Injuries by Anatomical Region in Wheelchair Athletes

<table>
<thead>
<tr>
<th>Region</th>
<th>Track</th>
<th>Field</th>
<th>No. of Injuries</th>
<th>% of all injuries</th>
<th>Incidence rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder/clavicle</td>
<td>2</td>
<td>9</td>
<td>11</td>
<td>19.3%</td>
<td>3.4</td>
</tr>
<tr>
<td>Elbow</td>
<td>1</td>
<td>8</td>
<td>9</td>
<td>15.8%</td>
<td>2.8</td>
</tr>
<tr>
<td>Knee</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>10.5%</td>
<td>1.9</td>
</tr>
<tr>
<td>Upper arm</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>8.8%</td>
<td>1.6</td>
</tr>
<tr>
<td>Wrist</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>7.0%</td>
<td>1.3</td>
</tr>
</tbody>
</table>
### Top 5 Injuries by Anatomical Region in Wheelchair Athletes

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<th>% of all injuries</th>
<th>Incidence rate</th>
</tr>
</thead>
<tbody>
<tr>
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<td>2</td>
<td>9</td>
<td>11</td>
<td>19.3%</td>
<td>3.4</td>
</tr>
<tr>
<td>Elbow</td>
<td>1</td>
<td>8</td>
<td>9</td>
<td>15.8%</td>
<td>2.8</td>
</tr>
<tr>
<td>Knee</td>
<td>1</td>
<td>5</td>
<td>6</td>
<td>10.5%</td>
<td>1.9</td>
</tr>
<tr>
<td>Upper arm</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>8.8%</td>
<td>1.6</td>
</tr>
<tr>
<td>Wrist</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>7.0%</td>
<td>1.3</td>
</tr>
</tbody>
</table>

*Problem of the throwing athlete*
World Para Athletics

IPC Medical Committee
Shoulder Study in Wheelchair Athletes

Track or Field

Pain

Ultrasound Scan of the Shoulder
IPC MEDICAL COMMITTEE
SHOULDER STUDY IN WHEELCHAIR ATHLETES

POWERLIFTING

AGE 18-50  MALE OR FEMALE
Associations between the three different assessments for all athletes combined (A) and for each of the three types of athletes (B-D).

[Key PESS = Physical Examination of the Shoulder Scale; WUSPI = Wheelchair User’s Shoulder Pain Index; USPRS = Ultrasound Shoulder Pathology Rating Scale]
ORIGINAL ARTICLES:
AD Webborn

"Boosting" performance in disability sport

...Original articles "Boosting" performance in disability sport "Boosting" performance in disability sport. | Sussex Centre for Sport and Exercise Medicine. | Journal Article | Autonomic Nervous System physiopathology | Blood Pressure physiology......

Prof Nick Webborn
IPC Medical Committee
Autonomic Dysreflexia (AD)

1. Full bladder or stimulus from bowel
2. Afferent stimulus
3. Massive sympathetic response
4. Widespread vasoconstriction
5. Hypertension
6. Baroreceptors in blood vessels detect hypertensive crisis — signal brain
7a. Heart rate slowed
7b. Descending inhibitory signals blocked at spinal cord injury

Level of spinal cord injury = T6 or above

HR ↓
BP ↑
• 40% of susceptible athletes questioned were unaware of boosting
• 17% of athletes questioned admitted to using boosting during training and/or competition
IPC Boosting Testing Programme 2008 - 2016
Chapter 4.2 - Position Statement on Autonomic Dysreflexia and Boosting

April 2016

3. A hazardous dysreflexic state is considered to be present when the systolic blood pressure is above 160mm Hg.

4. An athlete with a systolic blood pressure of above 160mm Hg will be re-examined approximately ten minutes after the first examination. If on the second examination the systolic blood pressure remains above 160mm Hg the person in charge of the examination shall inform the Technical Delegate to withdraw the athlete from the particular event in question.
Optimising the Care of the Athlete
The Team Physician
If sleep does not serve an absolutely vital function, then it is the biggest mistake the evolutionary process ever made\(^1\)
Illness at the London 2012 Paralympic Games and country clusters: Respiratory illness/1000 athlete days

- Southern Africa: 8.2
- Asia: 2.7
- South America: 2.7
- Europe: 1.3
- North America: 1.3
- North Africa: 1.3
Paralympic Sports Medicine Specialty Components - examples

Lifetime injury prevention: the sport profile model

Nick Webborn

ABSTRACT
Participation in sporting activities carries an injury risk. Conversely, the increased awareness that physical inactivity is a major risk factor for disease has led government agencies and the medical community to encourage increased levels of physical activity. Many people will achieve this through participation in sport. Injury inevitably leads to a reduction in participation on a temporary or permanent basis, but the injury experience may also influence the lifelong physical activity behaviour. Few studies adequately examine the possible long-term consequences of sport participation after the competitive period has been completed, but by understanding the patterns of injuries in different sports workplace. An employee who has been exposed to a health risk during their period of employment has a justifiable right to know what sort of risk they are exposing themselves to and what are the potential long-term consequences (LTCs) to their health of that employment. From the perspective of the Health and Safety Executive, it is about reducing the risk to ‘As Low As Reasonably Practicable’? The concept of ‘reasonably practicable’ lies at the heart of the British health and safety system and requires that an assessment must be made by the employer ‘in which the quantum of risk is placed on one scale and the sacrifice involved in the measures necessary for averting the risk (whether in money, time or
Cardiovascular Health

Cardiovascular diseases in Paralympic athletes

Antonio Pelliccia,1 Filippo M Quattrini,1 Maria Rosaria Squeo,1 Stefano Caselli,1 Franco Culasso,2 Mark S Link,3 Antonio Spataro,1 Marco Bernardi2,4

ABSTRACT
Background Sport participation (SP) of individuals with impairments has recently grown exponentially. Scarce scientific data, however, exist regarding cardiovascular (CV) risk associated with competitive SP.

Objective Assessing the prevalence of CV abnormalities and the risk for SP in Paralympic athletes (PA).

Methods PA (n=267; 76% men), aged 35±9 years, engaged in 18 sport disciplines, with a spectrum of lesions including: spinal cord injury (paraplegia and spina bifida) (n=116); amputation, poliomyelitis, cerebral palsy and other neuromuscular and/or skeletal disorders (Les autres) or visual impairment (n=151) entered the study. CV evaluation included history, PE, 12-lead and exercise ECG, echocardiography. Of these, 105 participated in ≥2 consecutive games, and had evaluable follow up globally followed by 3.8 billion TV audience spectators.

The astonishing performances that Paralympic athletes achieve have also raised a novel scientific interest, and prompted the issue of proper medical care of this unique athletic population. So far, very few studies, usually restricted to small groups of athletes, have addressed this topic and have reported conflicting functional or clinical features in Paralympic athletes.

In this study we sought to assess the prevalence and type of cardiovascular (CV) abnormalities in this athletic population and the risk, if any, inherent to competitive sport participation. To address these objectives, we took advantage of a data set derived from a large cohort of Paralympic athletes, engaged in a broad spectrum of sport disciplines, evaluated in our medical program before their participation.

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Published Online First
26 May 2016
Promoting Safe Sport – Dr Yetsa Tuakli
High incidence of injury at the Sochi 2014 Winter Paralympic Games: a prospective cohort study of 6564 athlete days

W Derman,¹,²,³ M P Schwellnus,²,³,⁴ E Jordaan,⁵ P Runciman,¹ P Van de Vliet,⁶ C Blauwet,⁷ N Webborn,⁸ S Willick,⁹ J Stomphorst¹⁰

ABSTRACT
Objective To describe the epidemiology of injuries at the Sochi 2014 Winter Paralympic Games.
Methods A total of 547 athletes from 45 countries were monitored daily for 12 days during the Sochi 2014 Winter Paralympic Games (6564 athlete days). Daily injury data were obtained from teams with their own medical support (32 teams, 510 athletes) and teams without their own medical support (13 teams, 37 athletes) through electronic data capturing systems.
Results There were 174 total injuries reported, with an injury incidence rate (IR) of 26.5 per 1000 athlete days (95% CI 22.7% to 30.8%). There was a significantly higher IR recorded in alpine skiing/snowboarding (IR of 41.1 (95% CI 33.7% to 49.6%) p=0.0001) compared to cross-country skiing/biathlon, ice sledge hockey or wheelchair equestrian. Injuries in the shoulder region were from the able-bodied sport to accommodate for the athletes’ impairment type, resulting in specific rule and regulation changes within the sports.⁴ The sport of snowboarding was introduced for the first time at the Sochi Games and has been adapted from the able-bodied version of the sport where a group of four athletes proceed down the course at the same time to a design where a single athlete proceeds down the course at a time, in an effort to provide a seemingly safer experience. Other adaptations have been made for impairments such as visual impairment, cerebral palsy, spinal cord injury and upper and lower limb loss, among others.³ For example, the use of a sledge and two adapted hockey sticks in ice sledge hockey has been adapted for use by individuals with lower limb impairment. Other examples include the use of a mid-ski for...
Reactive and Proactive

- Six fold increase in acute alpine ski injuries from the Vancouver 2010 Paralympic Games

- Risks:
  - Downhill
  - Upper part of course
  - Jumps
  - Snow conditions
Mitigating risk of injury in alpine skiing in the Pyeongchang 2018 Paralympic Winter Games: the time is now!

Wayne Derman,1,2 Cheri Blauwet,3 Nick Webborn,4 Martin Schwellnus,2,5 Peter Van de Vliet,6 Dimitrije Lazarovski6

downhill event, to familiarise athletes with the course and to allow for continuous adjustments to the course line prior to the official competitions. Earlier start times in the day to take advantage of more optimal snow conditions.

The Alpine venue allows for a more optimal start location on the course avoiding steep grades in response to previously reported high injury risks
High incidence of injuries at the Pyeongchang 2018 Paralympic Winter Games: a prospective cohort study of 6804 athlete days

Wayne Derman, Phoebe Runciman, Esme Jordaan, Martin Schwellnus, Cheri Blauwe, Nick Webborn, Jan Lexell, Peter van de Vliet, James Kissick, Jaap Stomphorst, Young-Hee Lee, Keun-Suh Kim

Objective To describe the epidemiology of sports injury at the Pyeongchang 2018 Paralympic Winter Games.

Methods 567 athletes from 49 countries were monitored daily for 12 days over the Pyeongchang 2018 Paralympic Winter Games (6804 athlete days). Injury data were obtained daily from teams with their own medical support (41 teams and 557 athletes) and teams without their own medical support (8 teams and 10 athletes) through two electronic data capturing systems.

Results 117 of 567 athletes (10.8%) reported a total of 158 injuries. The overall IR of the 12-day Sochi 2014 Paralympic Winter Games was 26.5 injuries per 1000 athlete days (95% CI 22.7 to 30.8). The combined sports of para alpine skiing and para snowboard (a subdiscipline of para alpine skiing at the Sochi Games) had a higher rate of injury (IR of 41.1 [95% CI 33.7 to 49.6], p=0.00001) compared with all other sport categories. Subsequent analysis indicates an individual IR of 43.8 (95% CI 35.0 to 54.9) for para alpine skiing and an IR of 30.3 (95% CI 17.7 to 52.0) for para snowboard. At the Sochi
When van Mechelen's sequence of injury prevention model requires a pragmatic and accelerated action: the case of para alpine skiing in Pyeong Chang 2018

Cheri Blauwet,¹,² Nick Webborn,³ James Kissick,⁴ Jan Lexell,⁵ Jaap Stomphorst,⁶ Peter van de Vliet,⁷ Dimitrije Lazarovski,⁸ Wayne Derman⁹,¹⁰
When van Mechelen's sequence of injury prevention model requires a
No. of Articles in PubMed Disability Sport / Paralympic

Sports and Exercise Medicine 2

Paralympic medicine

Nick Webborn, Peter Van de Vliet

Paralympic medicine describes the health-care issues of those 4500 or so athletes who gather every 4 years to compete in 20 sports at the Summer Paralympic Games and in five sports at the Winter Paralympic Games. Paralympic athletes compete within six impairment groups: amputation or limb deficiencies, cerebral palsy, spinal cord-related disability, visual impairment, intellectual impairment, or a range of physically impairing disorders that do not fall into the other classification categories, known as les autres. The variety of impairments, many of which are severe, fluctuating, or progressive disorders (and are sometimes rare), makes maintenance of health in thousands of Paralympians while they undertake elite competition an unusual demand on health-care resources. The increased physical fitness of athletes with disabilities has important implications for cardiovascular risk reduction in a population for whom the prevalence of risk factors can be high.

136 in 2018
Clincis Review Articles

PHYSICAL MEDICINE AND REHABILITATION CLINICS OF NORTH AMERICA

Para and Adapted Sports Medicine

EDITORS
Yetsa A. Tuakli-Wosornu
Wayne Derman
CONSULTING EDITOR
Santos F. Martinez

MAY 2018

WILEY-BLACKWELL

Handbook of Sports Medicine and Science

The Paralympic Athlete

EDITED BY
Yves Vanlandewijck and Walter R. Thompson

Training and Coaching the Paralympic Athlete

EDITED BY
Yves C. Vanlandewijck
Walter R. Thompson

WILEY Blackwell
SURROUND YOURSELF WITH PEOPLE WHO MAKE YOU A BETTER PERSON
WHERE ARE WE GOING NEXT?
Where do we go next?

• Longitudinal sport specific injury and illness surveillance in Para athletes
• Leading to effective prevention programmes including sports policy changes – e.g. rule changes, equipment, training, athlete behaviours
• The Older Para Athlete: morbidity and mortality in past Paralympic athletes
What would I like to see over the next 10yrs?

• Every International Federation with a longitudinal injury and illness surveillance programme
• An IPC branded team clinician course with global reach to help train NPC clinicians in the regions to train others
• Paralympic sports medicine as a recognised specialty with training programmes
• An ongoing research programme into the health outcomes and life quality of former Paralympians
Carlo Rovelli

“Science is an acute awareness of the extent of our ignorance”
• The Paralympic Games are a powerful demonstration of the vitality and achievements of disabled persons world-wide...”

• Kofi Annan, United Nations Ex-Secretary General (letter dated 7 September 2004
DREAM COME TRUE

Students face deportation as university visa row ignites

NATIONAL TREASURE

Stunning Storey leads GB medal rush
London 2012 Paralympic Games: bringing sight to the blind?

Nick Webborn

Br J Sports Med published online March 6, 2013
doi: 10.1136/bjsports-2013-092340

home games, there was certainly a greater media interest for ParalympicsGB going into the Games, but we were unprepared for the extent of the reaction to the sporting achievements of the athletes by both media and public. The coverage was unprecedented, the crowds of paying public were record breaking and people were clamouring for tickets or seeking the opportunity to glimpse a Paralympian.

The Paralympics were talked about on the tube or bus on the way to work by the usually reserved commuting public. It was news, it was interest, but moreover it was the sport. Sitting in the stadium of 80,000 people seeing David Weir win one of his gold medals was an electric and uplifting experience that I will not forget. The wall of sound that resonated around the stadium literally made the hairs on the

Figure 1. The front pages of national newspapers the day after Dame Sarah Storey wins the 1st gold medal for ParalympicsGB.
Prof Nick Webborn OBE
Chairman, British Paralympic Association
London 2012, Chief Medical Officer, Paralympics GB
1974 - 1980
Sir Ludwig Guttmann
1899 - 1980

Urodzony w Toszku
Wybitny Neurolog,
Twórca Ruchu
Paraolimpijskiego

Outstanding Neurologist Born in Tost, Poland, Founder of the Paralympic Movement

Gmina Tostek

Birth certificate of Ludwig
THANK YOU