International Paralympic Committee

Injury and Illness Epidemiology in Paralympic Sport – Lessons Learnt

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International Paralympic Committee
06 September 2016
Developing injury prevention programs?

Step 1
Quantify the problem:
Incidence
Severity

Step 2
Establish the aetiology and mechanism of injury

Step 3
Introduce a preventive measure

Step 4
Assess its effectiveness

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Welcome back!
Thank you for your ongoing commitment to this project. If you experience any problems with data entry please contact us.

Step 1: Select one of the three options below.
- Record an INJURY for the team today (or on the date selected below)
- Record an ILLNESS for the team today (or on the date selected below)
- No Injuries or Illnesses are recorded for the team today (or on the date selected below)

Step 2: Click on the date in the calendar below on which you wish to report an injury or illness.

<table>
<thead>
<tr>
<th>Month/Year</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
<th>Sunday</th>
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<tbody>
<tr>
<td>August 2012</td>
<td>20</td>
<td>21</td>
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<td>31</td>
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<tr>
<td>September 2013</td>
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<td>20</td>
<td>21</td>
<td>22</td>
<td>23</td>
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</tbody>
</table>
Ilness 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 Blauwet,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 Blauwet,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

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,5 Norma Angelica Patino Marques,1,7 Oriol Martinez-Ferrer,1,8 Esme Jordaan,9 Wayne Derman,1,10 Martin Schwellnus10
Highlights

- Web-based injury surveillance (IPC-IIS) improves compliance.
- Male and female athletes have similar injury rates.
- In female athletes, pre-competition injury rates are higher than competition injury rates.
- Injury rates are the lowest in the younger athletes.
- Half of all injuries seen at the summer Paralympics are new onset acute injuries.
- Highest rates of injury are shoulder, wrist/hand and elbow injuries.
- Highest rates of injury in football 5-a-side, powerlifting, goalball, wheelchair fencing, wheelchair rugby, & athletics.
Injury rate by sport – London 2012
A total of 216 injuries were reported in 977 athletes

- IP = 18.4 injuries per 100 athletes
  - Track: IP = 17.1
  - Field: IP = 19.8

- IR = 22.1 injuries per 1000 athlete-days
  (95% CI 19.5 – 24.7)
  - Track: IR = 19.1 (95% CI 15.7 – 22.6)
  - Field: IR = 25.2 (95% CI 21.3 – 29.1)
Injuries/1000 athlete days - Sport v Athletics Track Wheelchair

- Wheelchair Sports
- Mixed Sports
- Non-Wheelchair Sports
- Wheelchair Track
Injuries/1000 athlete days - Sport vs Athletics Field Wheelchair

[Bar chart showing injuries per 1000 athlete days with 95% CI for various Paralympic sports, including All, FB, PO, GB, W, WRAT, JU, W, TT, TW, BF, FT, VS, CT, EQ, SW, AR, BO, CR, S, AR, OSH.]
New findings from present studies: Athletics – track and field

The risk of injuries in Paralympic Athletics (track and field) differs by impairment and event discipline:
A prospective cohort study at the London 2012 Paralympic Games

- Wheelchair/seated athletes competing in seated throws (field) experienced a higher incidence of injury than those competing in wheelchair racing (track).

- Ambulant athletes with cerebral palsy experienced a lower incidence of injury in track disciplines when compared to other ambulant athletes.

- For both ambulant and wheelchair/seated athletes, the majority of injuries occurred in competition and do not result in time-loss from competition or training.

Blauwet et al. 2015,

- impairment and discipline specific
- Injury prevention programs should particularly be focused on athletes competing in seated throws and ambulant jumps, given that these disciplines experience a higher incidence of injury.
<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>Injury proportion (%)</td>
<td>11</td>
<td>15</td>
<td>29.3</td>
<td>12</td>
</tr>
<tr>
<td>Injury rate (/1000 athlete days)</td>
<td>9.2</td>
<td>12.7</td>
<td>24.4</td>
<td>8</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Overall Incidence</strong></td>
<td>19/100 athletes</td>
<td>12,9/100 athletes</td>
<td>9,6/100 athletes</td>
</tr>
<tr>
<td><strong>Upper limb Incidence</strong></td>
<td>7,2/100 athletes</td>
<td>NR</td>
<td>2/100 athletes</td>
</tr>
<tr>
<td><strong>Lower limb Incidence</strong></td>
<td>4,7/100 athletes</td>
<td>NR</td>
<td>5,5/100 athletes</td>
</tr>
</tbody>
</table>
### Results

<table>
<thead>
<tr>
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<td>NR</td>
<td>2/100 athletes</td>
</tr>
<tr>
<td></td>
<td><strong>1.5 : 1</strong></td>
<td></td>
<td><strong>0.3 : 1</strong></td>
</tr>
<tr>
<td><strong>Lower limb Incidence</strong></td>
<td>4.7/100 athletes</td>
<td>NR</td>
<td>5.5/100 athletes</td>
</tr>
</tbody>
</table>

Present study 2014  
Engebretsen et al 2013  
Junge et al 2008
Results

Most commonly injured region

Incidence

![Bar graph showing incidence of injuries per 1000 athlete days for different body regions: Shoulder, Upper arm, Elbow, Forearm, Wrist & hand. The Shoulder region has the highest incidence, followed by Wrist & hand, Elbow, Forearm, and Upper arm.]
Results

Severity of injuries

Incidence

![Graph showing the incidence of injuries in different body parts](image-url)
Results
Severity of injuries

Incidence

<table>
<thead>
<tr>
<th>Body Part</th>
<th>Number of Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder</td>
<td>50% ended competition</td>
</tr>
<tr>
<td>Upper arm</td>
<td></td>
</tr>
<tr>
<td>Elbow</td>
<td></td>
</tr>
<tr>
<td>Forearm</td>
<td></td>
</tr>
<tr>
<td>Wrist &amp; hand</td>
<td></td>
</tr>
</tbody>
</table>

- Shoulder: 50% ended competition
- Upper arm: 0
- Elbow: 1
- Forearm: 0
- Wrist & hand: 2
Results
Severity of injuries

Incidence

Number of injuries

- Shoulder: 50% ended competition
- Upper arm: 10% ended competition
- Elbow
- Forearm
- Wrist & hand
Risk Factors
Gender

- Shoulder: Females 1.5, Males 7.5
- Upper/Forearm/elbow: Females 3.0, Males 3.0
- Wrist & hand: Females 4.5, Males 6.0

**Injuries/1000 athlete days**

- **Females**
  - Shoulder: 1.5
  - Upper/Forearm/elbow: 3.0
  - Wrist & hand: 4.5
- **Males**
  - Shoulder: 7.5
  - Upper/Forearm/elbow: 3.0
  - Wrist & hand: 6.0
Risk Factors

Age

Here is the diagram showing the injuries/1000 athlete days for different age groups and body parts:

- **Shoulder**
- **Upper/Forearm/Elbow**
- **Wrist & Hand**

The data is represented for the following age groups:
- 13-25 yrs
- 26-34 yrs
- 35-67 yrs

The injuries are measured in Injuries/1000 athlete days.
Risk Factors
Age

Injuries/1000 athlete days

- Shoulder
- Upper/Forearm/Elbow
- Wrist & Hand

13-25 yrs
26-34 yrs
35-67 yrs
Risk Factors
Onset

Injuries/1000 athlete days

- Acute
- Acute on chronic
- Chronic

Shoulder
Upper/Forearm/elbow
Wrist & hand
Risk Factors
Onset

- Acute
- Acute on chronic
- Chronic

Injuries/1000 athlete days

- Shoulder
- Upper/Forearm/elbow
- Wrist & hand
Risk Factors
Onset

- Acute Acute on chronic Chronic
- Injuries/1000 athlete days
- Shoulder
- Upper/Forearm/elbow
- Wrist & hand

Rotator cuff injury Impingement
Risk Factors
Type of Sport

<table>
<thead>
<tr>
<th>Sport</th>
<th>Shoulder</th>
<th>Upper/forearm/elbow</th>
<th>Wrist &amp; hand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athletics</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Swimming</td>
<td></td>
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<td></td>
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<tr>
<td>Powerlifting</td>
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<td></td>
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<tr>
<td>Table tennis</td>
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<tr>
<td>Wheelchair basketball</td>
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<td>Goalball</td>
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<tr>
<td>Judo</td>
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</tr>
</tbody>
</table>
Risk Factors
Type of Sport

Injuries/1000 athlete days

- Shoulder
- Upper/forearm/elbow
- Wrist & hand

Athletics, Swimming, Powerlifting, Table tennis, Wheelchair basketball, Goalball, Judo
Risk Factors
Type of Sport

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<thead>
<tr>
<th>Sport</th>
<th>Injuries/1000 athlete days</th>
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<tbody>
<tr>
<td>Athletics</td>
<td>0.0</td>
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<td>3.5</td>
</tr>
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<td>Powerlifting</td>
<td>7.0</td>
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<tr>
<td>Table tennis</td>
<td>10.5</td>
</tr>
<tr>
<td>Wheelchair</td>
<td>14.0</td>
</tr>
<tr>
<td>Basketball</td>
<td>17.5</td>
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<tr>
<td>Goalball</td>
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<td>Judo</td>
<td></td>
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</table>

- Shoulder
- Upper/forearm/elbow
- Wrist & hand
1. Risk of upper limb injury 7.2% during the Games
2. Shoulder injuries most common
3. Risk factors
   • >35 years
   • Male
   • Swimming, powerlifting, judo

Conclusion

Upper limb injuries are common in athletes with impairment
Obrigado!