Injuries and Sports Surfaces

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Supported by:
Janda, 1997

“It is the responsibility of every healthcare provider within the field of sports medicine to enhance injury surveillance techniques and make the practice of prevention of injury the rule and not the exception”

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Injury patterns

- Overuse: microtrauma
- Acute: macrotrauma
Overuse injuries

- Training
- Re-Modeling
- Breakdown/Failure
- Adaptation
- Rest
Overuse injuries

**Intrinsic factors**
- Sex
- Age
- Growth/maturity
- Anatomy – Biomechanics
- Flexibility/muscle imbalance

**Extrinsic factors**
- Training errors: 60-80%
- Equipment
- *Surface*
- Environment/Climate

Predisposed athlete -> Susceptible athlete --> INJURY

? Inciting event
Overuse injuries: aetiology

Overload → Overuse

Impact force

Injury

No injury

Repetitions

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Kinetic chain
Overuse injuries: Research

• Biomechanical adaptation to surfaces: individual variability
• Stress fx in race horses: effect of surface
• Tennis: indoor: clay: grass: hard

• **Problem:** variables ++
Acute: Macrotrouma: Research

- NCAA American football: grass vs astroturf
- Rugby League – season change: winter to summer
- FIFA (Dr Colin Fuller)
Acute: Macrotrauma: American football Research: Grass vs FieldTurf

Grass:
- Increase:
  - Longer-term injury
  - Head injury
  - Ligament

FieldTurf:
- Increase:
  - Overall incidence
  - Non-contact injuries
  - Skin
  - Muscle
Acute: Macrotrauma: RL Research

- There is a higher risk associated with playing summer rugby league but the cause may not be related to the summer ground conditions.
- The cause may be related to a combination of factors which include training conditions, the indirect effects of the weather, player characteristics and changes within the game itself.
- Future studies should be concentrated in these areas.
Injuries during FIFA U-17 Tournaments

Dr Colin Fuller and Dr Astrid Junge
(FIFA Medical Assessment and Research Centre)

• From: ‘FIFA Quality Concept for Artificial Turf Guide’
  ‘FIFA has recognised the enormous benefits artificial pitches
  would bring to the global development of football’.

• FIFA also recognises the role that playing surfaces have on the
  incidence and nature of injuries to players.

• FIFA’s Medical Assessment and Research Centre is therefore
  assessing the impact of artificial turf on the incidence and nature
  of football injuries in a number of settings around the world.

• One of these settings is the FIFA Under-17 World Cup.
Injuries during FIFA U-17 Tournaments

• Tournaments using grass:
  – 1999 New Zealand
  – 2001 Trinidad and Tobago
  – 2003 Finland*

• Tournaments using Football Turf:
  – 2003 Finland*
  – 2005 Peru

*Both types of surface used during this tournament
Injuries during FIFA U-17 Tournaments

• Grass

*Match exposure –*
Games: 86
Hours: 2,822 player-hours

*Injuries -*
All injuries: 218
Time-loss injuries: 79

• Football Turf

*Match exposure –*
Games: 42
Hours: 1,386 player-hours

*Injuries -*
All injuries: 109
Time-loss injuries: 36
Injuries during FIFA U-17 Tournaments

• Incidence of Match Injuries

<table>
<thead>
<tr>
<th></th>
<th>Grass</th>
<th>Football Turf</th>
</tr>
</thead>
<tbody>
<tr>
<td>All injuries</td>
<td>77</td>
<td>79</td>
</tr>
<tr>
<td>Time-loss injuries</td>
<td>28</td>
<td>26</td>
</tr>
</tbody>
</table>
Injuries during FIFA U-17 Tournaments

- Mechanism of injury

<table>
<thead>
<tr>
<th></th>
<th>Grass</th>
<th>Football Turf</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Contact</td>
<td>Non-contact</td>
</tr>
<tr>
<td>All injuries</td>
<td>86%</td>
<td>14%</td>
</tr>
<tr>
<td>Time-loss injuries</td>
<td>85%</td>
<td>15%</td>
</tr>
</tbody>
</table>
Injuries during FIFA U-17 Tournaments Injury Location

<table>
<thead>
<tr>
<th>Location</th>
<th>Grass (All injuries)</th>
<th>Football Turf (All injuries)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head/neck:</td>
<td>15%</td>
<td>10%</td>
</tr>
<tr>
<td>Upper extremity:</td>
<td>6%</td>
<td>9%</td>
</tr>
<tr>
<td>Trunk:</td>
<td>8%</td>
<td>9%</td>
</tr>
<tr>
<td>Lower extremity:</td>
<td>71%</td>
<td>72%</td>
</tr>
<tr>
<td>Hip/groin -</td>
<td>2%</td>
<td>Hip/groin - 2%</td>
</tr>
<tr>
<td>Thigh -</td>
<td>13%</td>
<td>Thigh - 13%</td>
</tr>
<tr>
<td>Knee -</td>
<td>11%</td>
<td>Knee - 13%</td>
</tr>
<tr>
<td>Lower leg -</td>
<td>18%</td>
<td>Lower leg - 18%</td>
</tr>
<tr>
<td>Ankle/foot -</td>
<td>27%</td>
<td>Ankle/foot - 26%</td>
</tr>
</tbody>
</table>

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Injuries during FIFA U-17 Tournaments

<table>
<thead>
<tr>
<th>Injury Type</th>
<th>Grass (All injuries)</th>
<th>Football Turf (All injuries)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concussion</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>Fracture/dislocation</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>Sprain</td>
<td>13%</td>
<td>14%</td>
</tr>
<tr>
<td>Strain</td>
<td>10%</td>
<td>9%</td>
</tr>
<tr>
<td>Contusion</td>
<td>67%</td>
<td>60%</td>
</tr>
<tr>
<td>Laceration/abrasion</td>
<td>4%</td>
<td>6%</td>
</tr>
<tr>
<td>Other</td>
<td>4%</td>
<td>8%</td>
</tr>
</tbody>
</table>

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Future directions

• Sport driven epidemiology studies e.g. RFL: Surface effect
• FIFA: Surface comparison
• Targeted sports injury research e.g. Astroturf and Power league football: Surface specific
• Biomechanics: individual response to surface
• Rationale for new surfaces
Thank you and Questions

www.sportsurf.org

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