IS INJURY RISK INCREASED ON DROUGHT AFFECTED PLAYING GROUNDS?

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Worried Dons to monitor Telstra Dome surface

ESSENDON will investigate if the hard playing surface at Telstra Dome has contributed to its shocking run soft-tissue injuries, coach Matthew Knights said yesterday.

The Bombers are regular tenants of the Dome a played three of their first four matches at the this season.

While Knights admitted it is "a fact" that h with the Western Bulldogs

Footy kids doing it hard

Injuries mount on dried-up grounds

Sports probe looks for soft landing

Injuries are Multifactorial

Ground conditions is one possible factor when in examining injury risk

Focus on Australian Football

Risk Factors

- Age
- Previous injury
- Musculoskeletal factors
- Gender
- Ground conditions

Injury Example

Injury Rates in Australian Football

- Gabbe et al., 2002 reported 27 injuries per 1000 playing hours in VIC community level players
- Mc Manus et al., 2004 reported 24 injuries per 1000 playing hours in WA study
- Romiti et al.,2007 reported 18 injuries per 1000 playing hours in juniors

Approximately one injury per game !

What are the common injuries in Australian Football?

- Hamstring injuries are the most common injuries sustained by both community and elite level football players
  (Orchard & Seward 2007, Gabbe et al., 2006)
- 6.4 new hamstring injuries per AFL club in 2006 (Orchard & Seward 2007)
- Ankle sprains next most common 2.1 per AFL club in 2006 (Orchard & Seward 2007)

Ground Conditions & Injury

- Concussions and fractures have been associated with hard ground
- Stress fractures- running on harder/less compliant surface may increase impact forces and thus the rate and magnitude of bone loading, but evidence seems to be more anecdotal than empirical
- Anterior Cruciate Ligament (ACL) injuries have been associated with increased traction

Concussion Example 1

Concussion Example 2

How are ground conditions assessed?

Ground Condition Assessments

Two ways

- Observational Checklists

- Objective Direct Ground Measures

Direct Ground Measures

Hardness – Penetrometer

Soil Moisture – Moisture Meter

Hardness – Clegg Hammer

Rotational traction – Studded Boot

What does the evidence say about ground conditions and injury?

AFL Injury Reports- 15 years

The 2006 report had no grounds data included. But 2002 included it.

- The 2002 AFL injury report , 11 years data at AFL level. Five years prior to 2002 hardness measures were recorded using a penetrometer
- The only injury they found which had significantly higher rates on harder grounds were AC joint sprains
- More facial fractures on softer grounds
- No difference in hamstring injuries, quad strains, knee injuries, or ankle injuries on harder grounds
- The variable more likely to be responsible for differences is shoe-surface traction

Evidence

- McMahon et al. (1993) junior Australian football study and reported more injuries on firm or soft ground, but more fractures on harder grounds
- Subjective analysis of grounds

Evidence

- Clavicle fractures were associated with firmer grounds in one rugby union study in Sydney where injuries were monitored from 1969 – 1986 in one school (Davidson, 1987)
- Subjective analysis of grounds

Evidence

- Gabbett et al.(2007) studied ground conditions and rugby league injuries in Australia and found that hard ground did not influence training injuries but harder grounds and less annual rainfall were associated with increased injuries in matches
- Subjective analysis of grounds

Evidence

- AFL Penetrometer study by Orchard, (2001) found no significant relationship between harder grounds and the risk of ACL injuries
- More likely to be related to shoe-surface traction

Evidence

- Relationship between ground hardness and game speed (Norton et al., 2001) thus increasing collision impact forces
- Used penetrometer readings for hardness

Evidence

- Takemura et al. (2007) did a study in NZ on rugby union injuries and ground hardness
- They concluded that a non significant association was found between hardness and injury incidence but did find a seasonal bias
- Measured ground hardness using a penetrometer

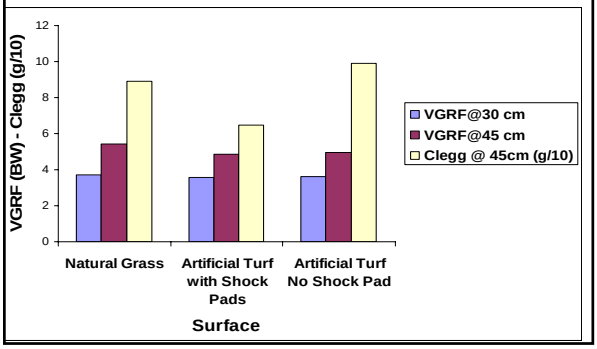
Early Season Bias

- Early season bias towards injuries has been found in many studies and harder grounds at the beginning of seasons has been suggested as a reason
- But the same has been found for some indoor sports where the ground conditions don't change

Early Season Bias Cont'd

- Orchard (2002) concluded that an early season bias was most certainly associated with ground conditions but it wasn't sure if it was hardness traction, or grass type that was to blame.

Finding from Artificial Turf Study at UB



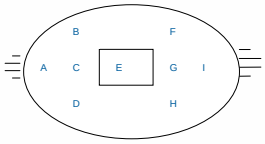
What research work is currently being undertaken?

Aims of Project

- Develop, trial and validate an observational checklist for match ground safety
- Compare the reliability of observational and direct ground measures
- Identify the relationship between the various ground condition measurements and injury incidence
- Quantify relationships between the common measures for hardness, rotational traction and volumetric soil moisture
- To provide recommendations to community football about appropriate ground conditions for minimising injury risk in Australian Football

Measurement Procedure

- All measures are taken in each of the nine positions below (A-I)

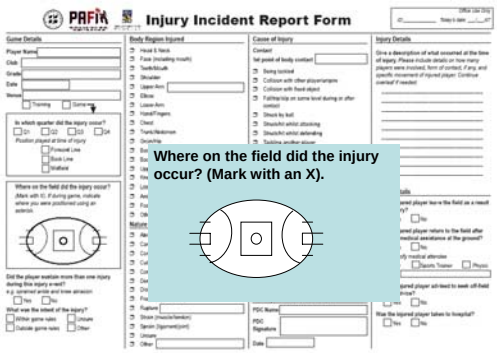


- Four repetitions of each piece of equipment at each site

Linked to PAFIX Project

- Preventing Australian Football Injuries through Exercise (PAFIX)
- National Health & Medical Research Council funded project ($1.06m)
- Examining the effectiveness of special training programs on reducing lower limb injuries in community level football players

Injury Data



PAFIR

GROUND CONDITION OBSERVATIONAL SHEET

Club Name:_____ Grade:_____ Date: _____ Training ☐ Game ☐

	Ratings			
Overall, what percentage of the playing area is covered in grass?	☐ 0 – 25%	☐ 26 – 50%	☐ 51 – 75%	☐ 76 – 100%
Would you consider the grass surface dry?	☐ Very dry	☐ Dry	☐ Wet	☐ Very wet
How would you rate the dryness of the non-grass areas of the field?	☐ Very dry	☐ Dry	☐ Wet	☐ Very wet
How would you rate the ground hardness?	☐ Very hard	☐ Hard	☐ Uncertain	☐ Soft
Are there any cracks wider than 20mm visible?	☐ None	☐ 1 - 5	☐ 6 - 10	☐ More than 10
Are there visible holes on the field?(e.g. potholes, divots, etc)	☐ None	☐ 1 - 5	☐ 6 - 10	☐ More than 10
Is the height of the grass adequate?	☐ Yes	☐ Too short	☐ Too long	
Is the playing surface even?	☐ Yes	☐ No		
Are there any sprinklers visible?	☐ Yes	☐ No		
Is there a wicket area in the middle of field?	☐ Yes	☐ No		
Do you believe the ground too hard to play on?	☐ Yes	☐ No		
Is the surface of the wicket area different from the rest of the field?	☐ No	☐ Natural turf	☐ Artificial turf	Other_____
What is the colour of the grass?	☐ Brown	☐ Green	☐ Brown & Green	
Has the surface been damaged by any machinery or animals?	☐ Yes	☐ No	Details	
In your opinion, is the surface suitable for playing on?	☐ Yes	☐ No		
Are there any areas of the field that you consider dangerous for the players (please give brief details)				

PDC Name: PDC Signature: Date:

Main Benefits of the Project

- Provide solid evidence on the link between ground conditions and increased injury risk for the first time at community level football in Australia
- Compare the reliability of observational and direct ground measures which will impact on methodology for future research in this area

VARIETY OF CONDITIONS

This project is funded and supported by Sport & Recreation Victoria and the University of Ballarat.

D.Twomey, L.Otago, C.Finch, J.Orchards, I. Chivers.

JUNIORS ENJOYING CRICKET SAFELY (JECS) PROJECT

- Examined the link between injury and ground conditions
- Being prepared for publication

Preventing Australian Football Injuries through Exercise (PAFIX)

Currently collecting ground hardness measures for 2008 season and will be able to link to injuries in 40 teams in both Victoria and Western Australia over 2 years (2007 & 2008)

PAFIX

PREVENTING AUSTRALIAN FOOTBALL INJURIES THROUGH EXERCISE

THE UNIVERSITY OF

Conclusions

- Ground conditions can be a factor in increased injury risk on substandard playing fields
- In addition to hardness, traction must also be considered
- Inconclusive evidence linking hard grounds to increased injury risk

Thank you for your attention!