A multidisciplinary approach in injury risk management in professional rugby union

2017/11/29

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What is rugby?
Injury vs. performance relationship

Injury Audit

Comparison of injury rate of a single professional rugby union team with population norms

League points tally

@JasonCTee
Targeting interventions

<table>
<thead>
<tr>
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<th>2012</th>
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<tbody>
<tr>
<td>Injury burden</td>
<td>2165 days</td>
</tr>
<tr>
<td>(total days lost)</td>
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<tr>
<td>Injury circumstance</td>
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<tr>
<td>• Match</td>
<td>60 %</td>
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<tr>
<td>• Training</td>
<td>40 %</td>
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<tr>
<td>Injury mechanism</td>
<td></td>
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<tr>
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<td>55 %</td>
</tr>
<tr>
<td>• Non-contact</td>
<td>45 %</td>
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Perhaps the training prescription isn’t right?

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Optimizing training

Tee, unpublished observations

@JasonC Tee
So how did we do?

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Less training injury = more of this
GO BACK AND START AGAIN
Contact injury model for rugby

Based on Bettencourt et al., BJSM 2016

Contact injury
(Emergent pattern)

Recursive loop
Recursive loop

Regularities
(Rugby – Contact Risk Profile)

Injuries are complex and multi-factorial

Changing ONE thing is unlikely to change the WHOLE system

Changing the system may have UNEXPECTED results

Fatigue

Contact event
Level of anxiety
Tackle technique
History of injury
Movement ability

Environmental conditions
Training load
Strength

Age
Body mass
Player speed
Neuromuscular capability
Playing surface

Contact injury model for rugby

Based on Bettencourt et al., BJSM 2016
How to approach a complex problem???

- Use every tool in the box!!!
Using the multi-disciplinary team

**S&C coach / Biokineticist**
- Prescription of training to improve performance and prevent injury.
- Strength / power training
- Return to play
- Aerobic / Anaerobic conditioning

**Physiotherapist**
- Treating injuries through “hands on” modalities
- Physiological monitoring
- Training load monitoring
- Psychological monitoring

**Sport Scientist**
- Optimising performance through interpretation of physical performance data
- Aerobic / Anaerobic conditioning
- Technical coaching
- Periodisation
- Planning training activities
- Diagnosis
- Treatment / therapy
- Screening
- Rehabilitation

**Doctor**
- Diagnosing injuries and developing injury management plans

**Technical / Tactical coaches**
- Directing technical and tactical training activities
- Tactical training
  - Skills
  - Game plan
- Tactical coaching
- Periodisation
- Planning training activities
- Screening
- Rehabilitation

**Using the multi-disciplinary team**
Day to day flow of information

- Coaches:
  - Technical/tactical
  - Skills
  - Strength and Conditioning

- Player:
  - Performance Feedback
  - Training prescription
  - Mode
  - Load
  - Game/Tech
  - Training response
  - Intrinsic/Extrinsic
  - Fatigue
  - Behaviour prescription
  - Sleep
  - Nutrition
  - Recovery

- Medical:
  - Doctor
  - Physiotherapist

- Sport Science:
  - Sport nutrition
  - Sport psychology
  - Performance analysis
  - Biomechanics

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Assessing outcomes in a complex system

Step 1. Establish the extent of the injury problem (Injury Audit)

Step 2. Establish aetiology and mechanism of injuries

Step 3. Introduce preventive measures

Step 4. Assess program effectiveness (Repeat injury audit)

Multi-disciplinary injury risk mitigation strategies

- Strength training
- Therapeutic interventions
- Technical coaching
- Psychophysiological monitoring
- Screening
- Training load monitoring
- Fitness training
- Rehabilitation strategies
- Return to play

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Successes - Screening

Preseason Functional Movement Screen Component Tests Predict Severe Contact Injuries in Professional Rugby Union Players

Jason C. Tee,1 Jannie F.G. Klingbiel,2 Robert Collins,2,3 Mike I. Lambert,4 and Yoga Coopoo1
Conditioning interventions

Fig. 1. Standard Kaplan–Meier survival curves for completing matches free of contact injury for 66 professional rugby league players. Four significant (or almost significant) risk factors are shown: (a) high body mass, (b) fast speed (40 m sprint), (c) poor upper-body strength (chin-up), and (d) poor prolonged high-intensity running ability. All curves are adjusted for players’ age, playing experience and usual playing position.
Coaching contact technique frequently
Successes – Reduced tackle injuries

**Interventions**

- Targeted strength program
- Increased exposure to contact skills training
Successes - Monitoring

Resting heart rate

Sleep hours

Injury risk based on change in resting heart rate from baseline

- Injury risk
- Non-contact injury risk

RHR magnitude of change from baseline (SD)

Non-contact Injury risk based on reported sleep hours.

<7 hrs  >7hrs
Effectiveness of the multi-disciplinary approach

Injury reduction only apparent after 3 cycles of the injury prevention cycle
Not a short-term process

It takes time to fine tune the injury prevention program to attain the desired result

Total injuries - 9% since 2012, likely beneficial
Contact injuries - 21% since 2013, most likely beneficial
Non-contact injuries - 39% since 2012, most likely beneficial

Job never done as the system is constantly changing!!!

Multi-disciplinary injury risk mitigation strategies
- Strength training
- Therapeutic interventions
- Technical coaching
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