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Risk Factors for Concussion – A Practical Guide

Concussion is a brain injury caused by traumatic forces which alter the way the brain functions and presents with a range of symptoms or signs which may or may not include loss of consciousness.

What is a concussion “Risk Factor”?

A ‘risk factor’ is a variable that is associated with an increased chance of illness or injury, in this case associated with an increased chance of sustaining a concussion. It is not necessarily a cause but has a higher association or increased correlation with concussion. These factors that influence concussion are also referred to as “modifying factors” as they also influence the brain’s ability to withstand and recover from injury. Having one or more of these risk or modifying factors makes you more likely to sustain a concussion and may delay recovery after having one.

Why is it important to identify concussion risk factors?

There are 3 main reasons why identifying risk factors may be important:

1. **Susceptibility** – having one or more of these risk factors is likely to make the chances of sustaining a concussion greater
2. **Recovery** – the presence of one or more risk factors may make the recovery process after sustaining a concussion much longer.
3. **Prevention** – understanding events that lead to concussion, factors that predispose players to concussion, and which factors influence recovery after a concussion may help prevent future concussions and their short and long term effects on brain function.

What are the main risk and modifying factors associated with concussion?

Those factors that have been shown to have a potential influence on increasing brain vulnerability or susceptibility to concussion and/or on prolonging recovery after concussion are listed under the different categories:

Risk and Modifying Factors associated with Concussion	
Risk Factor	Explanation
Age	<ul style="list-style-type: none"> • Players 18 years old and younger, but especially those under the age of 13
Gender	<ul style="list-style-type: none"> • Women and girls have increased risk compared to men and boys
Concussion history	<ul style="list-style-type: none"> • Previous concussion – especially more than 2 previous concussions or a concussion in the last 12 months • Less force than before required to cause successive concussions
Behaviour	<ul style="list-style-type: none"> • Aggressive on-field behaviour and risk-taking
Medical Conditions	<ul style="list-style-type: none"> • Headache and migraine sufferers <ul style="list-style-type: none"> - Personal - Family • Previous encephalitis or meningitis • Epilepsy • Thyroid dysfunction
Learning disabilities	<ul style="list-style-type: none"> • Attention deficit and hyperactivity disorders (ADD or ADHD)
Psychological conditions	<ul style="list-style-type: none"> • Depression • Anxiety • Sleep disorders
Treatment with certain drugs	<ul style="list-style-type: none"> • Psychostimulants e.g. Ritalin or Concerta • Anti-depressants • Anti-anxiety drugs (tranquilizers) • Sleeping tablets • Thyroid medication • Anti-epileptics

What other factors may play a role?

There is some evidence that certain people carry a **gene** that increases vulnerability to brain injury; **better conditioned** players may suffer fewer concussions; the **tackle** situation accounts for by far the greatest number of concussions; **protective equipment** (headgear and mouth guards) has not been shown to conclusively influence concussion rates; concussions occur at **all levels** of competition from professional to junior amateur level.

Why are these risk factors important to identify?

A player

- Should be aware of his/her own potential vulnerability to head injury
- Reduce risk by conditioning appropriately, avoiding risky on-field behaviour and not returning to play too soon after concussive injury
- Learning and practicing safe and effective contact rugby techniques, where the head and neck are least exposed and least vulnerable

A parent

- Should understand his/her child's risk of concussion
- Discuss known modifying factors with doctors, coaches and teachers
- Monitor a child's return-to-play according to the level of risk

A coach

- Should understand that some players are more vulnerable to concussion than others
- Discuss each concussed player's risk profile with parents, teachers and doctors
- Seek the doctor's advice on appropriate return-to-play guidelines for each player
- Teaching, coaching and practicing safe and effective contact rugby techniques, where the head and neck are least exposed and least vulnerable

A doctor

- Should appreciate the modifying risk factors that may influence susceptibility and may delay return-to-play
- Enquire about all modifying factors (as per SCAT3) during pre-season screening and at consultations
- Discuss potential risk factors with the player, parents and coaches
- Although not easily quantifiable, factor in modifying factors into return-to-play decisions
- Using appropriate best practice approaches in managing these players

In summary: the greater the number of **risk factors** the more likely the chance of **concussions** and **the longer the recovery process afterwards**.

Document Compiled by Dr Jon Patricios