

***BokSmart* – South African Rugby’s National Rugby Safety and Injury Prevention Program**

Jon Patricios MBBCh MMedSci FACSM FFSEM (UK) FFIMS

Extraordinary lecturer, Section of Sports Medicine, Faculty of Health Sciences, University of Pretoria, Pretoria,
South Africa

Honorary lecturer, Department of Emergency Medicine, Faculty of Health Sciences, University of the
Witwatersrand, Johannesburg, South Africa

Sports Medicine Consultant to the South African Rugby Union

PO Box 1267, Parklands, 2121 SOUTH AFRICA

Tel. +27 11 8839000

Fax. +27 11 2825165

jpat@mweb.co.za

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Rugby – the game

Rugby Union (“Rugby”) is a collision sport played by men, women, boys and girls in over 100 countries worldwide. In South Africa (SA) there are approximately 500 000 rugby players ranging from under 7 years old to senior professional players. Associated with Rugby as a collision sport are injuries some of which may be serious or even catastrophic. Historically in SA, the incidence of catastrophic head, neck and spine injuries in particular has been viewed as unacceptably high, albeit that more recent data has shown this to fall within an ‘acceptable’ level of risk (2). *BokSmart* is an injury prevention program and an intervention strategy that is evidence driven and evidence-based, and which implements policies to both reduce the number of injuries and manage them more effectively.

***BokSmart* – the program**

“*Bok*” refers to an antelope, the “*Springbok*”, that is South Africa’s national animal and emblem of the South African Rugby Team. “*Smart*” implies using a smarter and safer approach to playing rugby. *BokSmart* evolved from similar national safety programs in particular New

Zealand's *RugbySmart* (3) and is an initiative of the South African Rugby Union (SARU) in conjunction with the Chris Burger/Petro Jackson Players' Fund. South Africa has several challenges which any intervention strategy has to overcome, including the existence of many geographically remote, underprivileged and under-resourced communities. Historical data reveal that it is in these communities that catastrophic injury statistics are highest and their management most difficult (4). *BokSmart* specifically targets those closest to the player at the time of injury, namely coaches and referees, to ensure a basic standard of prevention, knowledge and care.

The format

BokSmart's program has 4 main components (10):

1. Rugby Safety Workshops - these are attended biennially by all coaches and referees nationwide; no one may coach or officiate Rugby at *any* level without being *BokSmart* certified no matter how qualified they might be; these free workshops are facilitated by accredited trainers in each province and are augmented by DVDs and printed material.
2. Online material – this is freely accessible at boksmart.com and provides evidence-based research on a wide range of sports medicine topics accompanied by practical, illustrated interventions.
3. The *BokSmart* Rugby Medic Program, an entry-level rugby-related first aid short course with a specific focus on head, neck and spine injuries, aimed at implementing appropriate immediate field side care particularly in underprivileged communities; this is augmented by the donation of essential equipment such as spine boards and cervical collars.
4. The *BokSmart* SpineLine – a toll-free hotline that provides advice on potentially serious rugby-related head, neck and spine injuries and facilitates ambulance transport to the nearest appropriate medical facility, where applicable.

The process

The *BokSmart* program is driven by a fulltime manager, employed by the South African Rugby Union (SARU), who co-ordinates management and steering committees, and facilitates program content, development and rollout nationally. The manager synchronizes input from medical and scientific experts on various aspects of sports, exercise and rugby medicine. Each expert's input begins with an updated literature review of his or her area, which is then translated into pragmatic protocols, to be implemented across all levels of the game. The most relevant and prioritized content is incorporated into the educational DVD's and is facilitated by the *BokSmart* trainers to all coaches and referees attending the Rugby Safety Workshops countrywide, reinforced by the printed material, and internet support. This is one of the ways, in which *BokSmart* aims to fulfill all 4 steps of Von Mechelen's concept of injury prevention (9).

Accomplishing the objectives of the *BokSmart* program includes:

- The education and training of all coaches and referees nationally on rugby safety matters; this is certification-based rather than accreditation-based to promote maximum participation; a national database of attendees is kept, and each participant receives a Certification Card with a unique Code and an expiry date on the license.
- The development of medical protocols for rugby at all levels; these are available on the website and updated when appropriate and include standardized injury reporting methods to enable data collection; protocols include:
 - Eating and drinking right for rugby
 - Effective play and controlling the game;
 - Fair play and *BokSmart* Code of Conduct;
 - Management of rugby injuries
 - Physical preparation and recovery techniques
 - Pre-participation screening of players
 - Pre-season testing and physical profiling of players
 - Protective equipment in rugby union
 - Safety in the playing environment
 - Serious injury protocol
 - Strength and conditioning for effective rugby
- Research – both as evidence-based reviews for every aspect of *BokSmart*'s injury prevention and management protocols and as an ongoing means of facilitating injury surveillance through the program leading to publishable outcomes; to date 15 peer-reviewed articles have been published both locally and internationally with 2 currently in review. (5)
- Legislation – the development of specific regulations and the addition or altering of the laws of the game to reduce injury risk; examples of the influence of the *BokSmart* program include the prohibiting of under-age players participating in senior rugby, school age-banding and the modification of scrum laws for amateur players.
- The communication and marketing of Rugby as a safer game through the website, scientific and public presentations and media interaction; Facebook (www.facebook.com/boksmart), Twitter (@BokSmart) and YouTube (www.Youtube.com/boksmartsa) platforms are available to reinforce, and increase exposure of the safety messages to a wider audience.

Specific interventions

Neck injuries

The scrum, a set piece whereby 8 forwards from each team interlock, pack down and push against each other to compete for the ball, has been identified as a significant contributor to

permanent catastrophic neck injury (1,7,8). *BokSmart*'s interventions include a large educational focus on player preparation for scrumming, coaching correct body position and technique, referees controlling and marshaling the scrums effectively and law and regulation changes to remove 'impact on engagement' injuries, prevent age and development mismatches and to control and better manage the setting of the scrum and ensuing scrum contest.

Concussion

SARU has had several cases in the past of rugby players dying from fatal head injuries that were either not identified or managed appropriately. *BokSmart* and SARU's philosophy on concussion is that no concussion should ever become a catastrophic event if appropriately recognised and managed from the time of the injury. Apart from forming a significant part of the coaches and referees' training on the biennial Rugby Safety Workshops, pocket concussion guides are provided to each attendee as well as posters for schools and clubs. The *BokSmart* website and 24 hour *BokSmart* SpineLine also provides more and detailed information on correctly identifying, treating and managing these injuries. The International Rugby Board's (IRB) guidelines, based on the latest International Concussion Consensus Statement (6) are strictly adhered to with a stringent policy of no return to play until a graduated (preferably medically-supervised) protocol is followed, and that the player is medical cleared before returning to full contact training and match play.

Monitoring effectiveness

The most well-intended and researched protocols may not lead to effective results if behaviors are not altered (2). South African Rugby, through the *BokSmart* program, aims to change the standard practices of players, coaches, referees and support personnel. *BokSmart* uses a form of Intervention Mapping (IM) to continually re-evaluate course content relevance and effectiveness. The step-wise process involves (i) defining the program objectives based on the extent of the problem (ii) choosing the most appropriate intervention to effect an outcome (iii) designing the intervention and selecting appropriate tools (iv) developing the implementation plan and (v) evaluating the intervention's success. To this end an expert research team of international and local sports and exercise scientists and epidemiologists is currently evaluating *BokSmart*'s effectiveness.

A 5-year analysis of serious and catastrophic head, neck and spine injuries (2008-2013) in SA shows a 14.6% decrease in the number of these injuries at amateur club level and a 23.9% decrease at school (under 18) level.

This is particularly encouraging bearing in mind that data collection is likely to have improved, a confounding variable that tends to increase rather than decrease injury statistics.

Moving forward...

BokSmart is an example of an intervention model based on the identification of a significant problem of serious injury. The program has highlighted risk factors, implements a strategy to address the issues that acknowledges regional demographic challenges, and employs independent monitoring to assess effectiveness. It is a local product that wishes to be judged by international standards leading not only to a significant reduction in injury, but also to greater participation in the game of Rugby Union as a form of sport and exercise.

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