**Offloads in Rugby Union: Northern and Southern Hemisphere International Teams**

Craig Pulling and Matthew Stenning

Department of Adventure Education and Physical Education, University of Chichester, Bishop Otter Campus, Chichester, PO19 6PE, UK.

**Abstract**

***The aim of this study was to explore the use of offloads by northern and southern hemisphere international teams within rugby union. A total of 491 offloads were analysed from 26 international rugby union matches.*** ***The matches that were analysed were sampled from four international series’: the 2012 Autumn International Series; the 2013 Autumn International Series; the 2013 Six Nations and the 2013 Rugby Championship. The northern hemisphere teams consisted of England, France, Ireland, Italy, Scotland and Wales. The southern hemisphere teams consisted of Argentina, Australia, New Zealand and South Africa. The southern hemisphere teams performed significantly more offloads during the 26 games compared to the northern hemisphere teams (U = 216.00, p = 0.02, r = -0.31). The southern hemisphere teams scored significantly more tries from the offloads performed compared to the northern hemisphere teams (U = 206.50, p = 0.01, r = -0.36)*** ***The findings suggest that southern hemisphere international teams are using the offload as an attacking strategy more effectively to score tries than northern hemisphere international teams. Future research into offloads should consider the tactics applied by the defensive team, the impact of environmental conditions and the channels of the pitch where offloads are performed.***

**Key words:**rugby union, offload, attacking, notational analysis.

**1. Introduction**

The sport of rugby union has developed and progressed since the start of its professional era in 1995 (Eaves and Hughes, 2003). The impact of professionalism in rugby union has resulted in a greater need for academic research and analysis in order to enhance performance within the sport (Vaz *et al*., 2011). As rugby union is a high contact sport, research has extensively looked at the physical elements of the sport (Roberts *et al*., 2008; Austin, *et al*., 2011) and ways to prevent or deal with injury (Chalmers *et al*., 2004; Gabbett and Ryan, 2009; Hendricks and Lambert, 2010). However, studies have also explored technical and tactical aspects of rugby union (Bishop and Barnes, 2013; Hendricks *et al*., 2014; van Rooyen *et al*., 2014).

Teams win rugby union games by outscoring the opposition. Teams can score through a number of different ways in rugby union: a try (5 points), a penalty try (5 points), a conversion following a try (2 points), a drop goal (3 points) and a penalty kick (3 points). A try is scored when the ball is touched down by the attacking team in their opponent’s in-goal area (International Rugby Board, IRB, 2013). It is important to research potential aspects of play that can influence try scoring as a try is awarded the highest amount of scoring points. An offload in rugby union is utilised by the attacking team with the aim of keeping possession and continuing an attack to potentially provide an opportunity to penetrate the defensive line and score a try. An offload is where the player carrying the ball is being tackled by a member of the opposing team, during this contact with the opposing player, the ball carrier attempts to pass or hand the ball to a member of their team in order to continue the attack (Hendricks *et al*., 2013). If an offload is performed successfully it will enable a team to retain possession of the ball (Wilkinson, 2005) and Johnson (2008) stated that offloading is the best way to maintain momentum in attack. Wheeler *et al*. (2010) stated that offloading in the tackle enhances a team’s try scoring potential. Jones *et al*. (2004) explored the contact area playing styles of northern and southern hemisphere international rugby union teams and collected data on the offloading behaviours of these teams. Jones *et al*. (2004) found that the southern hemisphere style of play involved the use of offloads from both backs and forwards and concluded that southern hemisphere teams’ ability to offload from all positions enhances their potential to be successful through consistently larger breaches of the gain-line. This study seems to imply that southern hemisphere teams were using the offload much more effectively than the northern hemisphere teams.

Offloading has been a crucial tactic in rugby league, another form of rugby football, as the rules of the game state that the attacking team may hold possession for a count of five completed tackles. After a sixth tackle is made possession must be turned over to the defending team (Hickley, 2006). The offload is therefore used in rugby league in order to prevent a tackle being completed and that allowed teams to continue attacking with the same number of tackles remaining. Gabbett *et al*. (2011) stated that effective rugby league players are able to use the offload as an attacking option. Prim and van Rooyen (2013) stated that the ability to effectively perform an offload is associated with winning teams in rugby league. The Rugby Football League (RFL) (2007), the governing body for rugby league in England, stated from a defensive perspective it is crucial to prevent the attacking team from offloading the ball. The RFL (2007) suggested the use of smother tackles, where the defender aims to pin the attacker’s arms to the body and therefore preventing the attacker from offloading the ball. Wheeler *et al*. (2011) explored the success of offloads in rugby league in relation to the quality of the offload. The results stated that 57% of tries were scored from a good quality offload (defined as the receiver not having to adjust the line of running or speed of running); this suggests that when used correctly the offload can be a key tactic for scoring a try in rugby league.

Offloading may be applied in rugby union with the aim of creating a line break and/or gaining yards. Creating a line break or being able to gain yards are seen as positive outcomes for the attacking team. Diedrick & van Rooyen (2011) defined a line break as when an attacking player beats the opposition by running through the defensive line i.e. running between two defenders. Diedrick & van Rooyen (2011) explored line breaks within international rugby union. They analysed 47 line breaks from 11 matches and found that 81% of line breaks maintained possession and that 51% of line breaks resulted in a try being scored. This implies that being able to create line breaks are desirable for attacking teams.

A key aspect of the study was to explore how international teams from the northern hemisphere and the southern hemisphere applied the use of an offload during a match. Southern hemisphere teams have had the most success in the most prestigious international tournament, the rugby union World Cup. Southern hemisphere teams have won six of the seven World Cups, with Australia, New Zealand and South Africa having won the tournament twice each. The remaining World Cup success was by a northern hemisphere team, England in 2003. The dominance of the southern hemisphere teams is also evident in the world rugby rankings (World Rugby, 2014) with New Zealand, South Africa and Australia regularly appearing in the top three or four ranks. Jones *et al*. (2004) explored offloading behaviour of southern and northern hemisphere international teams, however, this study only investigated successful offloads (when possession was maintained by the attacking team following an offload) and did not analyse offloads in relation to tries scored or areas of the pitch where the offload was attempted. The aim of this study was to explore the use of offloads by northern and southern hemisphere international teams within rugby union.

**2. Method**

Offloads were sampled from 26 International Rugby Union matches between the start of November 2012 and the end of November 2013. The matches that were analysed were sampled from four international series’: the 2012 Autumn International Series; the 2013 Autumn International Series; the 2013 Six Nations and the 2013 Rugby Championship. The northern hemisphere teams consisted of England, France, Ireland, Italy, Scotland and Wales. The southern hemisphere teams consisted of Argentina, Australia, New Zealand and South Africa. All of the matches analysed were taken from television coverage and a total of 491 offloads were analysed. The data were recorded onto a specifically designed Microsoft Office Excel spread sheet (Microsoft Corporation, Excel 2010, Redmond, WA). The area of the field that the offload occurred was recorded. The area D2 was recorded if the offload was performed by a team who were positioned between their own try line and the 22-metre line. The area D1 was recorded if the offload was conducted by a team between the 22-metre line and the half way line in their own defensive half. The area A1 was recorded if the offload was performed in the attacking half of the pitch between the half way line and the 22-metre line. The final area A2 was recorded if an offload occurred in the attacking half of the pitch between the 22-metre line and the opponents try line. The outcome of the offload was then recorded (for the operational definitions for the outcome of the offload see Table 1). A key area to identify for this study was the gain-line. For the purpose of this study the definition of the gain-line has been adapted so that instead of the gain-line existing through a ball winning contest, it was used as an invisible line across the pitch from side line to side line that goes through the player making the offload. This enabled the analyst to record if the player who received the offload gained yards, made it to the gain line where they were stopped or lost yards (behind the gain-line).

Table 1. Operational definitions for the outcome of the offload.

|  |  |
| --- | --- |
| **Offload outcome** | **Operational definition**  |
| Line break | The attacking player who receives the offload beats the opposition by running through the defensive line i.e. running between two defenders. (Diedrick and Van Rooyen, 2011) |
| Gain yards  | The attacking player who receives the offload advances past the gain line without breaching the line of defence (Biscombe and Drewett, 2010). |
| Stopped on gain line  | The attacking player who receives the offload reaches the gain line but does not go past the gain-line (Biscombe and Drewett, 2010). |
| Lose yards  | The attacking player who receives the offload is either tackled before they reach the gain-line or they reach the gain-line but are then moved behind it by the defensive team (Biscombe and Drewett, 2010). |
| Forward pass  | A forward pass occurs when the attacking player performing the offload passes the ball forward to a team-member. ‘Forward’ means towards the opposing team’s dead ball line. (IRB, 2013). |
| Intercepted | The offload was caught by a member of the opposition (Biscombe and Drewett, 2010). |
| Knocked on  | The attacking player who attempts to receive the offload does not catch the ball cleanly and the ball touches the ground or another player before the original player can catch it. |
| Incomplete pass | The offload was not received by a player from either team e.g. the ball was passed into touch. |
|  |  |

**2.1. Reliability**

Inter-observer and intra-observer reliability analysis were conducted in order to assess the objectivity and reliability of the data. An analyst who had two years’ experience of analysing rugby performed the inter-reliability analysis. The analyst viewed 112 (22.8%) of the 491 offloads. The analyst was presented with a copy of the operational definitions for the zones of the pitch and the outcomes for the offload and had a two hour training session with the original analyst. The intra-observer reliability analysis was completed by the original observer who viewed 112 (22.8%) offloads. The intra-observer reliability analysis was conducted five weeks after the initial analysis in order to reduce the potential learning effects. Kappa were used for both inter and intra-observer reliability for the zone of the pitch that the offload was made in and the outcome of the offload (see Table 2).

Table 2. Reliability tests and Kappa statistics.

|  |  |  |  |
| --- | --- | --- | --- |
| **Reliability****Test** | **Outcome** | **Kappa****Value** | **Strength of Agreement****(Altman, 1995)** |
| **Inter-observer** | Zone of the pitch | 0.93 | Very good |
| **Inter-observer** | Outcome of offload | 0.78 | Good |
| **Intra-observer** | Zone of the pitch | 0.97 | Very good |
| **Intra-observer** | Outcome of offload | 0.87 | Very good |

**2.2. Data Analysis**

All data are presented as absolute frequencies and supported by percentage occurrence (stated in brackets). The outcome data were collapsed into sub sections to create three outcomes instead of eight. Maintain possession and gain yards, was a combination of line breaks and gain yards. Maintain possession but do not gain yards, was a combination of stopped on the gain line and lose yards. Lost possession was a combination of the following outcomes: forward pass, knock on, interception and incomplete pass. Mann Whitney U tests were used to explore differences between the northern and southern hemisphere teams for the following areas, (1) the number of total offloads, (2) the percentage of offloads that led to a try being scored, (3) the percentage of offloads that maintained possession and gained yards, (4) the percentage of offloads that maintained possession but did not gain yards, (5) the percentage of offloads that lost possession. The alpha level was set at 0.05.

**3. Results**

From the 26 games analysed, 111 tries were scored, 43 by the northern hemisphere teams and 68 by the southern hemisphere teams. Of the 43 northern hemisphere tries, only 9 (20.9%) tries were scored from an offload whereas of the 68 southern hemisphere tries, 30 (44.1%) were scored from an offload. In total 491 offloads were recorded, with 228 offloads performed by the northern hemisphere teams and 263 offloads conducted by the southern hemisphere teams. The southern hemisphere teams performed significantly more offloads during the 26 games compared to the northern hemisphere teams (*U* = 216.00, *p* = 0.02, *r* = -0.31). From the 491 offloads performed, 39 resulted in a try. The northern hemisphere teams scored 9 tries from 228 offloads (3.9%), whilst the southern hemisphere teams scored 30 tries from 263 offloads (11.4%). The southern hemisphere teams scored significantly more tries from the offloads performed compared to the northern hemisphere teams (*U* = 206.50, *p* = 0.01, *r* = -0.36) (Table 3).

Table 3. Offloads and tries.

|  |  |  |
| --- | --- | --- |
|  | **Northern hemisphere** | **Southern hemisphere** |
|  |  |  |
| **Total tries scored** | 43 | 68 |
| **Tries scored from an offload (%)** | 9 (20.9) | 30 (44.1) |
|  |  |  |
| **Total attempted offloads** | 228 | 263 |
| **Number of offloads resulting in a try (%)** | 9 (3.9) | 30 (11.4) |

From the 228 offloads made by northern hemisphere teams, 129 offloads resulted in either gaining yards or a line break, this suggest the northern hemisphere teams were able to maintain possession and gain yards from 56.6% of offloads. The southern hemisphere teams were able to gain yards or break the line for 156 offloads of the 263 they attempted, this suggests that southern hemisphere teams were able to maintain possession and gain yards from 59.3% of offloads. There was no significant difference between northern and southern hemisphere teams and maintaining possession and gaining yards from an offload (*U* = 303.00, *p* = 0.52, *r* = -0.09). However, the southern hemisphere teams were able to produce a higher percentage of line breaks following an offload (14.1% of total offloads) compared to the northern hemisphere teams (5.7% of total offloads). The northern hemisphere teams had 60 occasions where an offload resulted in them either losing yards or stopping on the gain line (26.3% of total offloads), whilst for the southern hemisphere teams this occurred 63 times (24.0% of total offloads). There was no significant difference between northern and southern hemisphere teams and maintaining possession but not gaining yards from an offload (*U* = 322.00, *p* = 0.77, *r* = -0.04). On 39 occasions offloads by the northern hemisphere teams led to a forward pass, an interception, a knock on or an incomplete pass (17.1% of total offloads), this happened on 44 occasions for the southern hemisphere teams (16.7 % of total offloads). There was no significant difference between northern and southern hemisphere teams and losing possession from an offload (*U* = 307.00, *p* = 0.57, *r* = -0.08) (Table 4).

Table 4. Total offloads and all offload outcomes.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **Maintain possession and gain yards** | **Maintain possession but do not gain yards** | **Lose possession** |
|  | **Total attempted offloads** | **Line breaks**  | **Gain yards**  | **Stopped on gain line**  | **Lose yards**  | **Forward pass**  | **Intercepted**  | **Knocked on**  | **Incomplete pass** |
| **Northern hemisphere****(%)** | 228 | 13(5.7) | 116(50.9) | 26(11.4) | 34(14.9) | 6(2.6) | 11(4.8) | 20(8.8) | 2(0.9) |
| **Southern hemisphere****(%)** | 263 | 37(14.1) | 119(45.2) | 27(10.3) | 36(13.7) | 5(1.9) | 12(4.6) | 17(6.5) | 10(3.8) |

Northern hemisphere teams performed 75 offloads in the defensive half (32.9% of total offloads) and 153 in the attacking half (67.1%). Southern hemisphere teams conducted 66 offloads in the defensive half (25.1%) and 197 in the attacking half (74.9%). The southern hemisphere teams scored a higher percentage of tries from the total number of offloads conducted in zones D1, A1 and A2 compared to the northern hemisphere teams (Table 5).

Table 5. Offload tries and zone of the pitch.

|  |  |  |  |
| --- | --- | --- | --- |
| **Hemisphere** | **Zone of the pitch** | **Total number of offloads (%)** | **Tries scored from an offload (%)** |
| **Northern** | **D2** | 7 | 0 (0) |
| **D1** | 68 | 1 (1.5) |
| **A1** | 106 | 1 (0.9) |
| **A2** | 47 | 7 (14.9) |
|  |  |  |  |
| **Southern**  | **D2** | 5 | 0 (0) |
| **D1** | 61 | 2 (3.3) |
| **A1** | 125 | 11 (8.8) |
| **A2** | 72 | 17 (23.6) |

The northern hemisphere teams managed 13 line breaks with 12 of those occurring in the attacking half. Line breaks were made from 37 offloads for the southern hemisphere teams with 27 occurring in the attacking half. The northern hemisphere teams lost possession from an offload on 39 occasions with 12 of these being in the defensive half and 27 in the attacking half. The southern hemisphere teams lost possession from 44 offloads, with 8 of these occurring in the defensive half and 36 occurring in the attacking half (Table 6).

Table 6. Offload outcomes and zone of the pitch.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | **Maintain possession and gain yards** | **Maintain possession but did not gain yards** | **Lose possession** |
|  | **Zone of the pitch** | **Total number of offloads**  | **Line breaks**  | **Gain yards** | **Stopped on gain line**  | **Lose yards**  | **Forward pass**  | **Intercepted**  | **Knocked on**  | **Incomplete pass**  |
| **Northern hemisphere****(%)** | **D2** | 7 | 0(0) | 5(71.4) | 2(28.6) | 0(0) | 0(0) | 0(0) | 0(0) | 0(0) |
| **D1** | 68 | 1(1.5) | 34(50.0) | 5(7.4) | 16(23.5) | 2(2.9) | 3(4.4) | 7(10.3) | 0(0) |
| **A1** | 106 | 4(3.8) | 56(52.8) | 14(13.2) | 12(11.3) | 3(2.8) | 7(6.6) | 9(8.5) | 1(0.9) |
| **A2** | 47 | 8(17.0) | 21(44.7) | 5(10.6) | 6(12.8) | 1(2.1) | 1(2.1) | 4(8.5) | 1(2.1) |
|  |  |  |  |  |  |  |  |  |  |  |
| **Southern hemisphere****(%)** | **D2** | 5 | 0(0) | 1(20.0) | 2(40.0) | 2(40.0) | 0(0) | 0(0) | 0(0) | 0(0) |
| **D1** | 61 | 10(16.4) | 23(37.7) | 7(11.5) | 13(21.3) | 1(1.6) | 2(3.3) | 4(6.6) | 1(1.6) |
| **A1** | 125 | 14(11.2) | 54(43.2) | 12(9.6) | 18(14.4) | 3(2.4) | 8(6.4) | 9(7.2) | 7(5.6) |
| **A2** | 72 | 13(18.1) | 41(56.9) | 6(8.3) | 3(4.2) | 1(1.4) | 2(2.8) | 4(5.6) | 2(2.8) |

**4. Discussion**

The aim of this study was to explore the use of offloads by northern and southern hemisphere international teams within rugby union. From the 26 games analysed 111 tries were scored, 43 by northern hemisphere teams and 68 by southern hemisphere teams. A total of 39 tries were scored from an offload, this is 35.1% of the total number of tries scored. This percentage is lower than the 57% reported by Wheeler *et al.* (2011) within rugby league, another form of rugby football. The result from the current study is likely to be lower due to the different tactics applied by teams in the different formats of the game, and also that Wheeler *et al*. (2011) only explored good quality offloads, whilst the current study explored all offloads. Of the 43 northern hemisphere tries, only 9 (20.9%) tries were scored from an offload whereas of the 68 southern hemisphere tries, 30 (44.1%) were scored from an offload. This supports Wheeler *et al*. (2010) who stated that offloading in the tackle can improve a team’s try scoring potential. This suggests that southern hemisphere teams were using the offload as an attacking strategy more successfully than the northern hemisphere teams. This supports Jones *et al*. (2004) who concluded that southern hemisphere teams were using the offload more effectively when compared to northern hemisphere teams.

In total 491 offloads were performed within the 26 games observed, with 263 offloads performed by the southern hemisphere teams and 228 offloads conducted by the northern hemisphere teams. The southern hemisphere teams performed significantly more offloads during the 26 games compared to the northern hemisphere teams (*U* = 216.00, *p* = 0.02, *r* = -0.31). This suggests that the southern hemisphere teams are more likely to perform an offload when being tackled compared to the northern hemisphere teams. From the 491 offloads performed, 39 resulted in a try. The northern hemisphere teams scored 9 tries from 228 offloads (3.9%), whilst the southern hemisphere teams scored 30 tries from 263 offloads (11.4%). The southern hemisphere teams scored significantly more tries from the offloads performed compared to the northern hemisphere teams (*U* = 206.50, *p* = 0.01, *r* = -0.36). The results suggest that when the southern hemisphere teams perform an offload, it is more likely to lead to a try than when the northern hemisphere teams use an offload. The southern hemisphere teams, also scored a higher percentage of tries from the total number of offloads conducted in zones D1, A1 and A2 compared to the northern hemisphere teams. In zone A1, southern hemisphere teams converted 8.8% of offloads into tries, whilst for northern hemisphere teams it was only 0.9%. In zone A2, 23.6% of offloads led to tries for southern hemisphere teams, however, it was only 14.9% for northern hemisphere teams. The results suggest that southern hemisphere teams are considerably more likely to score a try from an offload in the attacking half of the pitch, when compared to the northern hemisphere teams. Again, these findings support the work of Jones *et al*. (2004) as it appears that southern hemisphere teams are using the offload more effectively than northern hemisphere teams, even when considering different locations on the pitch.

The northern hemisphere teams were able to maintain possession and gain yards from 56.6% of offloads, whilst the southern hemisphere teams were able to maintain possession and gain yards from 59.3% of offloads. The results suggest northern and southern hemisphere international teams are able to use offloads to gain yards and this supports Johnson (2008) who stated that offloading was important for maintaining momentum in attack. The results also suggest that offloading can be crucial to move forwards and continue attacks, which were two key principles of rugby union stated by Biscombe and Drewett (2010). Jones *et al*. (2004) found that the southern hemisphere teams’ ability to offload from all playing positions enhances their potential to be successful through consistently larger breaches of the gain-line. The current study did not explore the playing position of the players offloading the ball, however, it is evident that both northern and southern hemisphere teams were able to gain yards from an offload. There was no significant difference between northern and southern hemisphere teams and maintaining possession and gaining yards from an offload (*U* = 303.00, *p* = 0.52, *r* = -0.09). However, the southern hemisphere teams were able to produce a higher percentage of line breaks following an offload (14.1% of total offloads) compared to the northern hemisphere teams (5.7% of total offloads). Diedrick & van Rooyen (2011) explored line breaks within international rugby union and found that 81% of line breaks maintained possession and that 51% of line breaks resulted in a try being scored. The southern hemisphere teams were able to use the offload more successfully to break a line of defence then when compared to the northern hemisphere teams. The use of an offload to lead to a line break should be considered as a key tactic to score tries in rugby union.

One limitation of this study is that it does not account for the pattern of defence (for example, rush, static or lateral), the number of defenders at the contact area (for example, one, two or many) and the speed of defence that is being applied by the opposition. Wheeler *et al*. (2010) found that the pattern of defence and the number of defenders at the contact area can influence the success of attacking strategies such as offloads and line breaks. Also, Hendricks *et al,* (2013) stated that defensive speed, defined as the speed of the defence in response to the attacking line, was a statistically significant predictor of preventing the attacking team from advancing towards the gain line. It appears that the defensive tactics applied by a team has the potential to influence the success of an offload and these should be considered when conducting further research on offloading in rugby union. Another limitation of this study is that there has been no consideration for environmental factors, such as the weather and the conditions of the pitch. Teams may not use the offload as often or as effectively in very wet conditions, as the handling of the ball will be difficult, and therefore teams may adopt a more kicking based attacking strategy in such conditions. Objective meteorological data would be required to explore the weather conditions, however, Taylor *et al*. (2008) state that this data is not available from video recordings, upon which notational analysis studies are commonly based (as is the case for the current study). Although this study considered different locations on the pitch, these were based on the distance from the opposition’s try line. It may have been beneficial to have also explored the channels (right, central and left) on the pitch where offloads were performed. Hendricks *et al*. (2013) found that offloads are more likely to be performed when the ball is passed wide, which implies that offloads will be used more often in the right and left channels than in the central channel of the pitch. It would be advised that future research should consider the use of offloads in different channels of the pitch. A final limitation of the current study is that it failed to account for the quality of opposition, the match status (winning, drawing and losing) and the match location (home or away). Mackenzie and Cushion (2013) stated that these concepts should be considered when analysing association football, therefore it seems appropriate to suggest that future research analysing technical and tactical factors of rugby union should take these concepts into account.

**5. Conclusion**

The aim of this study was to explore the use of offloads by northern and southern hemisphere international teams within rugby union. There was a significant association between northern and southern hemisphere teams and the number of offloads and how many resulted in a try. The findings suggest that southern hemisphere international teams are using the offload as an attacking strategy more effectively to score tries than northern hemisphere international teams. Future research into offloading in rugby union should consider the tactics applied by the defensive team and how this impacts on the effectiveness of offloads, the impact of environmental conditions and the channels of the pitch where offloads are performed.

**6. References**

Altman, D. G. (1995), **Practical Statistics for Medical Research.** London: Chapman and Hall.

Austin, D., Gabbett, T. and Jenkins, D. (2011). The physical demands of Super 14 Rugby Union. **Journal of science and medicine in sport**, 14, 259-263.

Biscombe, T. and Drewett, P. (2010). **Rugby: Steps to success**. Leeds: Human Kinetics.

Bishop, L. and Barnes, A. Performance indicators that discriminate winning and losing in the knockout stages of the 2011 Rugby World Cup. **International Journal of Performance Analysis in Sport**, 13, 149-159.

Chalmers, D. J., Simpson, J. C. and Depree, R. (2004). Tackling rugby injury: Lessons learned from the implementation of a five-year sports injury prevention program. **Journal of Science and Medicine in Sport / Sports Medicine Australia**, 7 (1), 74-84.

Diedrick, E. and Van Rooyen, M. (2011). Line break situations in international rugby. **International Journal of Performance Analysis in Sport**, 11, 522-534.

Eaves, S. and Hughes, M. (2003). Patterns of play of international rugby union teams before and after the introduction of professional status. **International Journal of Performance Analysis in Sport,** 3, 103-111.

Gabbett, T., and Ryan, P. (2009). Tackling technique, injury risk, and playing performance in high-performance collision sport athletes. **International Journal of Sports Science and Coaching,** 4 (4), 521-533.

Gabbett, T., Jenkins, D. and Abernathy, B. (2011). Relationships between physiological, anthropometric and skill qualities and playing performance in professional rugby league players. **Journal of Sports Sciences**, 29 (15), 1655–1664.

Hendricks, S., and Lambert, M. (2010). Tackling in rugby: Coaching strategies for effective technique and injury prevention. **International Journal of Sports Science and Coaching**, 5 (1), 117-136.

Hendricks, S., Roode, B., Matthews, B. and Lambert, M. (2013). Defensive strategies in rugby union. **Perceptual & Motor Skills: Exercise & Sport,** 117 (1), 65-87.

Hendricks, S., Matthews, B., Roode, B. and Lambert, M. (2014). Tackler characteristics associated with tackle performance in rugby union. **European Journal of Sport Science**, 14 (8), 753-762.

Hickey, J. (2006*).***Understanding rugby league**. Leeds: Coachwise.

International Rugby Board. (2013). **Laws of the game: Rugby Union**. Available at: http://www.irblaws.com/downloads/IRB\_Laws\_2013\_EN.pdf (Accessed 22 November 2014).

Johnson, H. (2008). **Rugby Union Manual: The official guide to playing the game***.* Yeovil: Haynes Publishing.

Jones, N., Mellalieu, S., James, N. and Moise J. (2004). Contact area playing styles of northern and southern hemisphere international rugby union teams. In O’Donoghue, P. and Hughes, M. (Eds.) **Performance Analysis of Sport VI.** Cardiff: University of Wales Institute.

Mackenzie, R. and Cushion, C. (2013). Performance analysis in football: A critical review and implications for future research. **Journal of Sports Sciences,** 31 (6), 639-676.

Prim, S. and van Rooyen, M. (2013). Rugby. In McGarry, T., O’Donoghue, P. and Sampaio, J. (Eds.) **Routledge Handbook of Sports Performance Analysis** (pp.338-356). London: Routledge.

Rugby Football League. (2007). **Know the game: Rugby League** (3rd edition). A&C Black: London.

Roberts, S. P., Trewartha, G., Higgitt, R. J., El-Abd, J., and Stokes, K. A. (2008). The physical demands of elite English rugby union. **Journal of Sports Sciences**, 26 (8), 825-833.

Taylor, J. B., Mellalieu, S. D., James, N. and Shearer, D. A. (2008). The influence of match location, quality of opposition, and match status on technical performance in professional association football. **International Journal of Performance Analysis in Sport,** 26 (4), 885-895.

Thomas, J. R. and Nelson, J. K. (1996). **Research methods in Physical Activity** (3rd Edition). Champaign, Il: Human Kinetics.

van Rooyen, M., Yasin, N. and Viljoen, W. (2014). Characteristics of an ‘effective’ tackle outcome in Six Nations rugby. **European Journal of Sport Science,** 14 (2), 123-129.

Vaz, L., Mouchet, A., Carreras D., Morente, H. (2011). The importance of rugby game related statistics to discriminate winners and losers at the elite level competitions in close and balanced games. **International Journal of Performance Analysis in Sport,** 11, 130-141.

Wheeler, K., Askew, C. and Sayers, M. (2010). Effective attacking strategies in rugby union. **European Journal of Sport Science**, 10 (4), 237-242.

Wheeler., K, Wiseman., R. and Lyons, K. (2011). Tactical and technical factors associated with effective ball offloading strategies during the tackle in rugby league. **International Journal of Performance Analysis in Sport**, 11 (2), 392-409.

Wilkinson, J. (2005). **How to play rugby my way.** London: Headline.

World Rugby. (2014). **World Rugby rankings**. Available at: http://www.worldrugby.org/rankings/ (Accessed 22 November 2014).