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DISSERTATION ASSESSMENT PROFORMA:
 Empirical ¹

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Dissertation title:	Identifying the effectiveness of a chop tackle in elite and semi-professional rugby union	
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Comments	Section	
	Title and Abstract Title to include: A concise indication of the research question/problem. Abstract to include: A concise summary of the empirical study undertaken.	
	Introduction and literature review To include: outline of context (theoretical/conceptual/applied) for the question; analysis of findings of previous related research including gaps in the literature and relevant contributions; logical flow to, and clear presentation of the research problem/ question; an indication of any research expectations, (i.e., hypotheses if applicable).	
	Methods and Research Design	

¹ This form should be used for both quantitative and qualitative dissertations. The descriptors associated with both quantitative and qualitative dissertations should be referred to by both students and markers.

	<p>To include: details of the research design and justification for the methods applied; participant details; comprehensive replicable protocol.</p>
	<p>Results and Analysis ²</p> <p>To include: description and justification of data treatment/ data analysis procedures; appropriate presentation of analysed data within text and in tables or figures; description of critical findings.</p>
	<p>Discussion and Conclusions ²</p> <p>To include: collation of information and ideas and evaluation of those ideas relative to the extant literature/concept/theory and research question/problem; adoption of a personal position on the study by linking and combining different elements of the data reported; discussion of the real-life impact of your research findings for coaches and/or practitioners (i.e. practical implications); discussion of the limitations and a critical reflection of the approach/process adopted; and indication of potential improvements and future developments building on the study; and a conclusion which summarises the relationship between the research question and the major findings.</p>
	<p>Presentation</p> <p>To include: academic writing style; depth, scope and accuracy of referencing in the text and final reference list; clarity in organisation, formatting and visual presentation</p>

² There is scope within qualitative dissertations for the RESULTS and DISCUSSION sections to be presented as a combined section followed by an appropriate CONCLUSION. The mark distribution and criteria across these two sections should be aggregated in those circumstances.

CARDIFF METROPOLITAN UNIVERSITY
Prifysgol Fetropolitan Caerdydd

CARDIFF SCHOOL OF SPORT

DEGREE OF BACHELOR OF SCIENCE (HONOURS)

SPORT & PHYSICAL EDUCATION

**To identify the effectiveness of a chop tackle in elite
and semi-professional rugby union.**

Performance Analysis

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CARDIFF SCHOOL OF SPORT

CARDIFF METROPOLITAN UNIVERSITY

Identifying the effectiveness of a chop tackle in elite and semi-professional rugby union

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Abstract

The aim of this study was to analysis how effective a chop tackle was between two different levels of rugby union. The analysis was conducted from ten Rugby World Cup games in 2011 and ten Principality Welsh Premiership games from the recent season 2012/13. A specific design was implemented to collect the relevant data on different variables to create specific performance indicators. The analysis was conducted using a hand notation system as each game was observed using different performance indicators to code the data. A Mann Whitney U test was used to compare the variables between RWC and WP. A Wilcoxon test was then used to compare the differences of chop with other types of tackles at the different levels. P values that are less than 0.05 were deemed to be significant. The 125 average tackles per team for a match performed in the RWC were significantly greater than 88 tackles in WP ($p < 0.05$). 31% of tackles in RWC were chop which was significantly greater than 22% in WP ($p < 0.05$). At both levels a chop tackle lead to significantly more turnovers than other types of tackles, it also lead to a significantly greater percentage of unsuccessful outcomes than other tackles ($p < 0.05$) . Therefore a chop tackle is considered a high risk performance but it leads to a greater chance in turning the ball over. This skill should be implemented as part of the team's tactics when they need to take risks to provide a higher chance of getting the ball back.

CHAPTER ONE: INTRODUCTION

Introduction

1.1 Background

The aim of this study was to produce a valid and reliable method of analysing different performance indicators of a tackle in rugby union and to find a solution to whether a chop tackle is effective in both elite and semi-professional rugby union. Twenty matches were analysed home and away for this study with ten from the Rugby World Cup in 2011 and ten from the Welsh Premiership season 2012/13. Performance indicators were used for different tackles performed by a forward or a back and where it was performed on the pitch. Different key performance indicators were developed in relevance to the information that is going to be collected and notated using a hand notation system. This study will produce results and provide readings on the effectiveness of a chop tackle in the two different level playing fields. The results collected can be used by individuals and coaches to help improve the defensive performance of their side by analysing and comparing semi-professional to that of elite rugby union players. Johnson (2002) documented that rugby union is an invasion game that involved team work and co-operation between coaching staff and players. Rugby is made up of two halves of forty minutes (Hughes and Bartlett, 2002). There are fifteen players on each with seven substitutes (Collins, 2009). The main purpose of rugby union is to score as many points as possible, but not conceding as many points (Cooke, 1991). It is possible to score points in several ways in rugby union; drop goals, conversions, penalty kicks and try's. One of the main objectives in preventing the opposition scoring is to have a solid defence in terms of tackling and turning the ball over (Greenwood, 2003). According Long and Hughes (2004) performance analysis is vastly developing through rugby union and provides objective feedback for both players and coaches on different individuals and teams.

1.2 Purpose of the Study

The purpose of the study is to collect specific data over a significant amount of matches to produce a valid result surrounding the 'chop' tackle in semi-professional and elite rugby union. Performance indicators will be put in place to collect the data and categorise the results. This study is looking at different variables on how the tackle was made, by what player, where on the pitch and whether it was successful,

unsuccessful or was a successful turnover. Analysing the data provides beneficial results in whether the chop tackle has implemented a turnover or is not providing efficient ball play. Therefore analysing the readings you will successfully know if the 'chop' tackle is successful in rugby union and we will re-evaluate the findings and compare the tackle with two different level playing fields to find out what players can perform the tackle with the most positive outcomes i.e. turnover ball.

1.3 Need for the Study

There is a good opportunity for this study to succeed because there is a GAP in the knowledge surrounding this subject field, therefore any information collected would provide influential readings that different players and coaches can access in order to re-evaluate their training and progress as individuals. Analysing and comparing the elite matches from the Rugby World Cup the Welsh Premiership will provide more in depth knowledge of the subject area and will offer further information on the effectiveness of a chop tackle in the two different levels that were analysed. Due to that fact that there is no revelation to a chop tackle in previous knowledge so the findings from this study will provide a core to other study's in this subject field. This study will contribute to specific rugby literature by providing more information on the effectiveness of a chop tackle in the game outside of the scientific context. Therefore it will be very beneficial for coaches and players alike as well as identifying the different key performance indicators. The expectation of this study is to provide a foundation for the effectiveness of a chop tackle and to assess the relevant performance indicators to provide the best possible results.

1.4 Scope

The study is analysing two different levels of play from the current season 2012/13 and will provide valid results that provide a key distinction of the effectiveness of the chop tackle in both level playing fields. Data will be collected from the Rugby World Cup in the New Zealand and the Principality Welsh Premiership. Results will be provided and a problem would have been identified with knowledge to evaluate whether a chop tackle is effective in semi-professional or elite rugby union. This study will hopefully identify and validate the key performance indicators needed for different tackles on the pitch and contribute research that will improve the knowledge of this subject.

CHAPTER TWO: LITERATURE REVIEW

Literature Review

2.1 Performance Analysis in Sport

O'Donoghue (2010) stated that performance analysis is an area of sport that relates to the performance of the athlete, and this is used instead of such in-depth laboratory test or self-evaluation reports performed by the teams or athletes. Performance analysis has been proven to provide athletes and coaches with a better indication of the skill performed; therefore it is used as a helpful device in improving different aspects of performance (Hughes and Bartlett, 2002). Due to the rise of professionalism in sport there was significant demand of understanding how different teams and individuals performances assisted the overall result in relation to successful performances. O'Donoghue (2010) explains that performance analysis is used to develop a greater understanding of the different sports which can enhance decision making by those athletes pursuing to develop sports performance. McGarry et al. (2002) explains that teams competing at the elite level will use some form of analysis to reflect upon past performance and how they can implement different tactics and improve performance for the next match. O'Donoghue et al. (2008) coincided a study that come to some agreement with McGarry and Franks (1994) by the different effects of the opposition team or athlete can have a significant impact on performance indicators. Following a piece constructed by Reid et al. (2010) a study in tennis investigates the outcome of different opponent's in relation to the overall outcome of the game and in reference to their seed ranking, this can be related to the type of opponent in rugby union and the effect they have on the performance. Performance analysis is influential in aiding and developing performance at the top level and for elite athletes to remain competing at that stage there is a need to develop their performance. Liebermann et al. (2002) explains that technology has been improved significantly which enables the athlete to improve their own performance through self-evaluation and feedback. Hughes and Bartlett (2002) discuss a piece of literature on how Liebermann et al. (2002) provide the coach and athlete with critical data that relates to the performance. O'Donoghue (2008) explains that the development of different performance analysis systems throughout a sporting field provides a judgement on what performance indicators are needed in order to successfully analyse the performance. Performance analysis is relied upon to produce effective data analysis, providing coaches with dependable data to make

suitable changes to enhance the performance. Without this trustworthy data it would make coaches accountable to applying incorrect information which may lead to poor training techniques. To allow progression for the coaches and the athletes match analysis is vital for coaches to analyse the different actions that took place in the previous performance (Vivian et al., 2001).

2.2 Performance Analysis studies in Rugby Union

The continuing development of professional sport has led to an increased emphasis on the provision of technical scientific support to aid the coaching process. Part of this progression has included the comprehensive analysis of the behavioural aspects of sports performance known as match or notational analysis (Lyons, 1997). Jones et al. (2007) illustrated that performance analysis within rugby union is very narrow with a limited number of studies analysing the different work rate of position specific players, looking at patterns of play and other features of rugby. Although the process of collecting and analysing frequency data is commonly used by sports scientists working in applied settings, research of this nature is often undertaken within the confines of the environment of the team, organization or governing body.

Hughes and Franks (1997) suggest that analysing rugby union can be very challenging. They further explain that it is affected by the different set pieces and the tough ruling and complication at the breakdown area. Vivian et al. (2001) created a system that was used performance profiles that were specific to different positions throughout domestic, European and international tournaments. Performance profiles were created to measure the defensive and attacking data for players playing in specific positions. Parsons and Hughes (2001) illustrated a system that analysed different patterns of players throughout international and European matches. They focused on the different skill demands analysing every position and found out how the responsibilities vary between each position. There is a limitation to Hughes and Parsons (2001) and Vivian (2001) because they highlighted the skills that were required for the individual position but specific outlines were not created (James, et al., 2005). Greenwood (1997) found that in rugby union, each playing position has different roles and responsibilities that are exclusive and shared to other playing positions in rugby

Hughes et al. (2001) stated that performance indicators influence the design of specific performance profiles that designate a pattern of performance by the performers. The data is collected and the different performance indicators are analysed to aid future performance and help to predict the outcome.

Treadwell (1992) carried out a study that consisted of forty different variables that occur in rugby and carried out analysis from the Five Nations. Hughes and Franks (1997) established that the data was useful and followed the hypothesis, with rugby union providing a measure for prediction and that is regardless of the different variables tested taking into consideration the team selection or playing conditions. Van Rooyen, Lambert and Noakes (2006) illustrated that rugby union can be measured on how teams are successful and non-successful by a team winning a match, therefore team must score points to successfully overcome the opposition side. In order to score points teams must therefore build points by scoring tries, and converting penalties, drop goals and conversions. Sommerville (1997) summarises that all of those components can be beneficial in determining the result of the match. Van Rooyen, Diedrick and Noakes (2010) comprised a study that would analyse matches being played in the Rugby World Cup 2007 and whether the amount of rucks in a game could calculate to a win. Van Rooyen et al. (2010) illustrated that the data collected and analysed is to show if there is a link between the number of successful rucks and a victory for the winning side. Results from the International tournament's worldwide that include RBS 6 Nations, RWC and the CASTROL Tri Nations all produced similar readings that experienced the greater successful rucks resulted in a more matches won. Other studies have been implemented to further collect data analysis. Jones et al. (2004) identified the amount of differences that significantly change in relation to the performance of the team. According to Hughes and Bartlett (2002) they used an example of how lineout throws success rate alters between the winning and losing performances of the team. Hughes et al. (2012) found that Ortega (2009) studied different performance indicators in rugby like turnovers, line breaks and possessions kicked. The data collected displayed a weighty difference in favour for the winning performance in the Six Nations tournament.

Long and Hughes (2004) compared the pre-professional game to the 'modern era' and discovered the intensity of the defence leading to an increase in rucks over the

period of the match. This provides key information for specific position on the field because it highlights player's roles and responsibilities. This data can be very beneficial because it can then be used as a specific performance indicator for a specific position, highlighting how many tackles are made throughout the game. Carter (1996) used quantitative and qualitative data to collect data using time motion analysis and measure the heart rate of a back row forward. Hughes and Franks (2004) explained that the information collected displayed that the results altered from the three different positions in the back row. Hughes and Franks (1997) illustrated that the qualitative video recordings of different game events and coaching systems contribute to another element to the research. Potter (1996) validated the influence of notational analysis by collecting data of performance from England rugby in the Five Nations 1992-1994. The analysis shows that researched conducted in this way might be beneficial from a direct proposition instead of just recording the data.

Limited studies of research have been conducted on the analysis of referees and their performance in rugby union. Catterall et al. (1993) and Asami et al. (1988) both displayed that football referees covered an average distance of 9,500 metres and 11,200 metres over the course of a game. This showed no relevance to studies that have been finalised for rugby union referees. Hughes and Franks (2004) claim that the Welsh Rugby Union has quoted figures that referees walk 0.5miles, jog 1.5miles and sprint 0.75 miles. Hughes and Hill (1996) established the study in being one of the first data analysis systems to be focused on the referee's performance. Hughes and Franks (2004) illustrate the difficulties rugby union due to the vast and complex laws, with extreme difficulty at the breakdown and lineouts. This system can benefit officials in the types of training programs they are allocated and can aid the growth of their participants in the professional era.

Hughes and Franks (1997) talk about the studies that have observed the different rules changes in rugby union. Hughes and Clarke (1994) conveyed a study that analysed the effect of the rule changes and how it altered the patterns of play by performances. Data was collected and found that the more tries were scored after three or more phases but found that by observing the analysis there were no frequent changes in the number of breakdowns generated in the game and also the differences found may be affected by the increasing standard of play in the performance.

2.3 Tactical Evaluation

Hughes and Franks (2008) describe it as the tactical patterns of play and has been an influential part to play for many researchers. This can be used at different levels across the playing field, whether that is elite or semi-professional rugby union. Sanderson and Way (1977) used different signs to notate different swimming strokes. The key emphasis on was to gather information of the patterns of play coincide with the match data. A study was constructed on analysing substitutions during the UEFA European Championships in 2000 Pearce and Hughes (2001). This was to find out whether a substitute player made a positive or negative impact on the overall performance of the team. Hook and Hughes (2001) analysed the different attacking plays that lead to a shot or a goal scored in football. These different studies can supply relevant information for the coach to use as tactical strategies that produces a positive outcome.

2.4 Technical Evaluation

Hughes et al. (2008) identified that highlighting players advantages and weaknesses can be seen as important information for coaches in relation to improving their athlete's performance. Brown and Hughes (1995) used an analysis system that presents where shots have been played on the court and whether it was an error or a winner. This provides feedback for the coach because they cannot remember all the shots that have been played so therefore provides information by providing what types of shots have been played and associate what the strengths and weaknesses were against their opponent (Hughes et al., 2008).

Hughes and Franks (2008) illustrated that technical evaluation has a very theoretical use for coaches as they analyse performance at different levels of athletes. Bishovets et al. (1993) comprised a computer analysis system that acquired information of different technical and tactical plays in matches of the 1990 FIFA World Cup and the 1988 Olympics. Bishovet's study provides coaches with effective procedures that they can implement as technical work and increase the athlete's development. Hughes and Franks (2008) display that in racket sports winning shots and errors are described as influential indicators of technical ability and are used as research for different notational analysis studies. Hughes and Franks (1997) stated

that the changes in the analysis will generally depend on the different demands the coaches want from their players.

2.5 Opposition Effect

Lago-Penas et al. (2009) documented that team abilities are important in influencing technical and tactical performances in games. According to Sasaki et al. (1999) the difference in quality of the opposition led to an influence in performance. O'Donoghue (2009) has devised three mechanisms that lead to opposition effect. The process and result of a performance is influenced by the quality of the opposition side, and example could be based on world ranking points and seeding's in tennis. O'Donoghue (2008) discovered that the two levels of play have an effect on the performance. Tennis player's different key performance indicators are highlighted to be lower when playing against the world number one and a lot higher when playing against world number 250. O'Donoghue (2008) suggested that the quality of opposition in professional soccer is also an influential factor of an individual's technical performance.

2.6 Comparing Two Levels of Play (level effect)

O'Donoghue (2008) compared two levels of play in Netball from the Commonwealth Games by comparing the types of performances and categorising them into World class and International teams. This would allow losses by the World class teams to be recognised as superior performances than some of the victories over the international teams, taking into consideration the strength of the opponent. Butcher and O'Donoghue (2007) stated that a key advantage is the different features of the performance and that can be related to standards for the opposition's strength in the match. O'Donoghue (2008) explained that the overall performances of the teams produced a null effect in relation to the hypothesis made. The data and results recorded by the specific performance indicators all produced similar readings for each team in the league. To compare the different levels of play O'Donoghue (2008) sectioned the league into top half and bottom half because that then related to the quality of the opposition in a better way.

2.7 Identifying Key Performance Indicators in Rugby

According to Hughes and Barrett (2002) they defined a performance indicator as a combination, section, of action variables that is produced to critique different phases of performance. To recognise the key performance indicators needed for the study, an importance must be placed on the different indicators that are relevant to the successful outcome of the performance. Hughes and Franks (2004) states that if an indicator has been acknowledged without a reason, due to the fact it's not beneficial to the athlete, coach, team or the result of the performance then it will not contribute and increase the specific performance highlighted by the study. James et al. (2005) identifies the relation of some performance indicators can be recorded in combination and relate to a specific position (forward or back). By choosing the performance indicators relevant for this study James (2005) states that it's not about producing a big list of all behaviours but to choose the correct indicators to produce good data. Jones et al. (2004) analysed the contact area of the Northern and Southern Hemisphere International teams by comparing the different types of tackles used and how frequent they were being used. For this data to be analysed several performance indicators had been selected to include the different variables that Jones was looking to collect. A study performed by Parsons and Hughes (2001) analysis the patterns of play in elite sport in International and European club rugby union matches, analysing the skill demands for each specific position with reference to on and off the ball support (Hughes, et al., 2012). Parsons and Hughes' (2001) study has limitations because common performance indicators were not created for the study as they showed little detail as to why the relevant indicators were selected.

CHAPTER THREE: METHODOLOGY

Methodology

3.1 Overall Research Design

Producing a valid hand notation system required extreme planning, variations and experiments with the different operational classifications. Time was dedicated to clarify what performance indicators were highlighted and whether they were relevant for the purpose of the study, this would enable the data to be analysed accurately and ensure validity throughout the study. The system was designed to record all the valuable data in reference to the performance indicators used for the study in a rugby union game. The results recorded would provide data on how effective a 'chop' tackle is in rugby union and convert the outcomes of the skill by comparing two models of performance to see which level field can best perform the skill effectively. Each individual game was fully analysed phase by phase observing the tackle situation. The tackles performed were compared and contrasted between semi-professional and elite teams, identify the success of the tackle, who made the tackle and where it was completed on the field.

3.2 System Development

To develop a system capable of producing effective results, specific performance indicators were developed to form the base of this study. The study was aimed to create and provide a list of the different behaviours of a rugby union player performing a tackle and assigning where they performed the tackle on the pitch, what type of tackle and was it successful or unsuccessful. This was an in-depth analysis of the tackles performed, therefore additional key performance indicators needed to be introduced into the study. Allocating more specific KPI's into the study would provide specific readings on the analysis and display an in-depth study which would be more accurate. To find out if a 'chop' tackle was successful in the comparison of two different level playing field, elite and semi-professional it was key to observe the type of tackle performed by what player, where on the field and if the chop tackle contributed to a successful turnover. It was ensured that these areas had detailed indicators observing in the current study. The indicators that were chosen are as followed;

- Team – Elite/ Semi-professional

- Player – Back/Forward
- Where – Pitch area
- Type – Chop/other
- Outcome – Successful turnover/ successful / unsuccessful

The specific behavioural indicators were derived from analysis recorded on the different variables for the identification of a tackle in rugby union.

To make sure all the important and relevant data was collected from each match, data collection forms were specifically made to code the data in the easiest possible way. The system template was designed in Microsoft Excel, the prototype was structured to incorporate all the different variables by making the data collection easy and practical by combining a collection of indicators. The welsh premiership games are recorded by the WRU and are accessed through the WRU analysis website, and the Rugby World Cup games were recorded by the performance analysis team in Cardiff Metropolitan University. Table 1 illustrates the data collection sheet and its intent to collect numerous indicators of performance in one tick of a box. Meaning coding the data will be less time consuming due to the structure of the model.

Table 1: Data Collection Sheet

QUARTER:-	TEAM:-	Competition:-	VERSUS:-	Try Line	
	Try line	22m	Half Way	22m	Try Line
FORWARD	Chop	ST			
		S			
		U			
Other	Chop	ST			
		S			
		U			
BACK	Chop	ST			
		S			
		U			
Other	Chop	ST			
		S			
		U			
FORWARD	Chop	ST			
		S			
		U			
Other	Chop	ST			
		S			
		U			
BACK	Chop	ST			
		S			
		U			
Other	Chop	ST			
		S			
		U			
FORWARD	Chop	ST			
		S			
		U			
Other	Chop	ST			
		S			
		U			
BACK	Chop	ST			
		S			
		U			
Other	Chop	ST			
		S			
		U			

The design of the data collection sheet would allow all the relevant information to be gathered in a precise and simple manor. This particular method of hand notation is simplistic in its form but requires the skills to understand and observe the footage while collecting the data. To record the data into the form would be done by tallying in the correct allocated box for each represented indicator. To make the data collection much more accurate in its findings, all the functioning performance indicators were defined to make it clear for the analyst to understand and observe

Table 2: Description of Key Performance Indicators

Performance Indicator	Definition
Successful Turnover (chop) - ST	A chop tackle has been completed, resulting in the ball being turned over
Successful (chop) - S	A chop tackle has been completed correctly
Unsuccessful (chop) - U	A chop tackle has been unsuccessfully completed leading to a missed tackle or incomplete
Chop – type of tackle	A tackle below or knee height that brings the ball carrier straight to the ground
Other – type of tackle	Any other tackle that is completed on the opposition and is legal
Forward – player	A player numbered 1-8
Back – player	A player numbered 9-15

A pilot study was conducted to prove whether the system design was working efficiently and if it was going to produce reliable results. It also tested if there was enough information being recorded by the different performance indicators and whether it would provide valuable and precise data to conclude the overall study. The system was piloted on a game from the Welsh Premiership between Bridgend Ravens and Llanelli RFC at the Brewery Field. The previous template did not provide enough valid data that this study was looking for, so it had to be altered. Therefore, to improve the validity of the study additional performance indicators needed to be adopted into the study to ensure there was enough effective data being collected to deliver the overall results. The main aim of the pilot study was to familiarise with the system and its coding process, and to decide on whether the system needed alterations to be able to collect reliable and valid data. The pilot would also help implement the opportunity to identify any issues when conducting the analysis.

For this system to work appropriately only one team would be analysed at a time as this provided fluent and reliable data collection. Bryman (2004) suggests that validity is described as the integrity of the conclusions, this means the data collected overall and the results produced provide a precise log of what happened. For this system to be valid the key performance indicators were discussed and observations put in place to make sure the study would fulfil its potential by finding out a conclusion to the possible argument. It was confirmed that all the behaviours in the match had been discussed with a senior performance analysis to reflect the specific points that the system was going to analysis. Emphasising the importance to test the system

prior to the data collection, ensured the system had the capability of producing valid data and to provide results that were reliable.

3.3 Matches

The data resembled the effectiveness of a chop tackle and the differences between elite and semi-professional teams in rugby union. The matches analysed were taken from the Rugby World Cup 2011 and the Welsh Premiership season 2012/2013. The twenty four teams analysed in this study were; Pontypridd, Cross Keys, Llanelli, Bridgend, Bedwas, Neath, Newport, Llandovery, Aberavon, Cardiff, Carmarthen, Swansea, New Zealand, Wales, Ireland, South Africa, Australia, France, Argentina, England, Scotland, Italy, Samoa and Fiji. Overall ten games had to be analysed each in the respected level with both sides' data being collected from one match. To produce valid data it was critical for inclusion by analysing the top ten International teams in the world including Samoa, Fiji and Italy as this will produce the best possible results. Therefore the comparison of elite and semi-professional teams will be more realistic and ensuring validity in the work. It is also critical for exclusion, meaning each team would not be analysed more than twice. This is because you want to have an overall result that each team has contributed too.

3.4 Data Analysis

The purpose of the study was to discover how effective a chop tackle was in rugby union and comparing the results between semi-professional and elite rugby union to find the best outcome. As referenced in the text there is limited knowledge on this research proposal therefore it would create important findings that can be drawn upon by different athletes. This study is a hand notational data collection system that can be very beneficial and extremely simplistic when knowing how to code the footage. Different frequency variables and percentage variables were compared between two levels of play using a series of Man-Whitney U tests. This system is a non-parametric statistic test that assesses two different models of observations that have different principles to each other. Turning the data into results by using different graphs is the best way to showcase the information collected in a professional manner by making it simple to observe. By producing the results in different graphs it makes it easier to analyse and find different aspects of the chop tackle and how it is used throughout semi-professional and elite rugby union. This is all conducted to find out

about the chop tackle, and whether it is effective on the rugby field or whether players shouldn't revert to using it as much.

CHAPTER FOUR: RESULTS

Results

4.1 Analysing the data

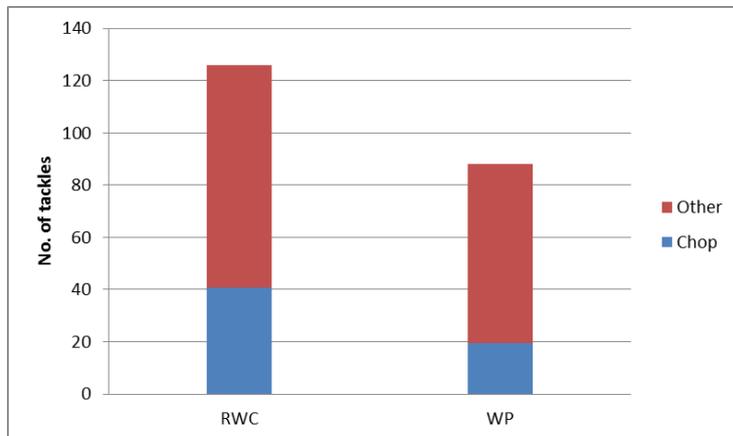


Figure 1: A graph to show the amount of chop and other tackles performed in the Rugby World Cup and Welsh Premiership.

The graph shows information highlighted in both RWC and WP. The readings indicate that the elite performers made on an average more tackles than semi-professional athletes with a reading of 125 tackles per game, compared to 88. Figure 1 illustrates that in the RWC 31% of the overall tackles made were chop compared to a lower success rate of 22% in WP. There is a significant difference for the percentage of overall tackles that were ($p=0.037$) which shows that a chop tackle is effective in RWC and WP.

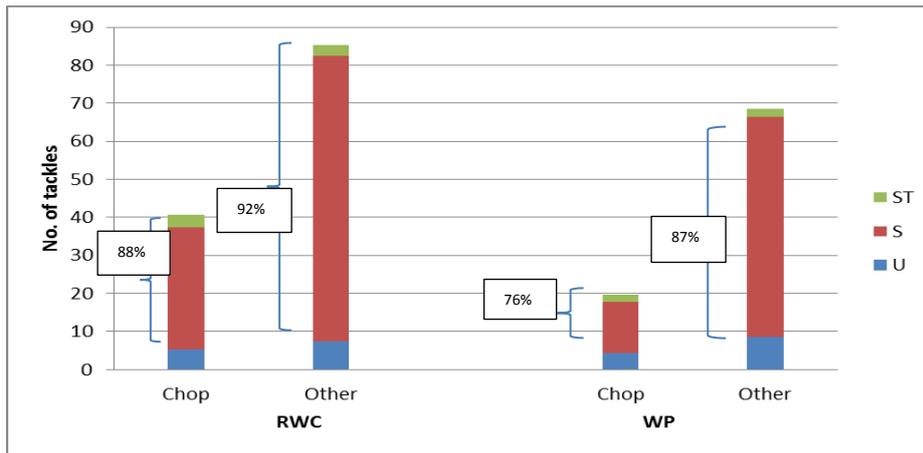


Figure 2: A graph to show the success of a tackle in RWC and WP.

After analysing the percentage of how many tackles were performed and how frequent the type of tackle was used, this graph however breaks down the different tackles and focuses on the success rate. Analysing the graph the ST (successful turnover) for a chop tackle is greater in semi-professional with a 9% success turnover rate compared to 8% in elite. Overall the chop tackle outcome is greater performed by elite athletes with an 88% successful turnover and successful completion, compared to semi-professional which is only 76%. The comparison of both tackles performed by each individual field shows there are more successful turnovers being completed by a chop tackle with the difference being;

- Elite - 8% chop 4% other
- Semi Pro – 9% chop 3% other
-

With further readings being revealed Figure 2 shows that with the combination of successful turnover and successful completion of the tackle, the other tackle has higher percentage readings. This could be because the other tackle is safer and has a higher success rate compared to the chop tackle which is a high risk tackle which leads to missed tackles but is a high risk high reward tackle, therefore it produces more successful turnovers than the other tackles. The percentage readings explain that the chop tackle is more effective and to produce more turnovers in a game, a chop tackle technique needs to be implemented. A Wilcoxon W test was used to find the compared results of a successful turnover from both chop and other in RWC and WP. As Figure 2 shows, there is a significant difference ($p=0.03$) between a successful turnover (ST) chop and (ST) other tackle in the RWC and WP. This

shows that when the chop tackle is performed it is significantly different ($p < 0.05$) showing it is more effective because they produce more frequent turnovers when performing the skill. Another test was constructed from the data, which compared the ST, S chop tackle and the ST, S other tackle in elite and semi-professional. The results in the Wilcoxon showed there was a significant difference of ($p = 0.04$) between the two conditions in the WP. This shows that the tackle success and success of turnover rate is significantly more effective in the semi-professional WP. Therefore in elite RWC there is no significant difference in the comparison of a ST, S chop and ST, S other tackles.

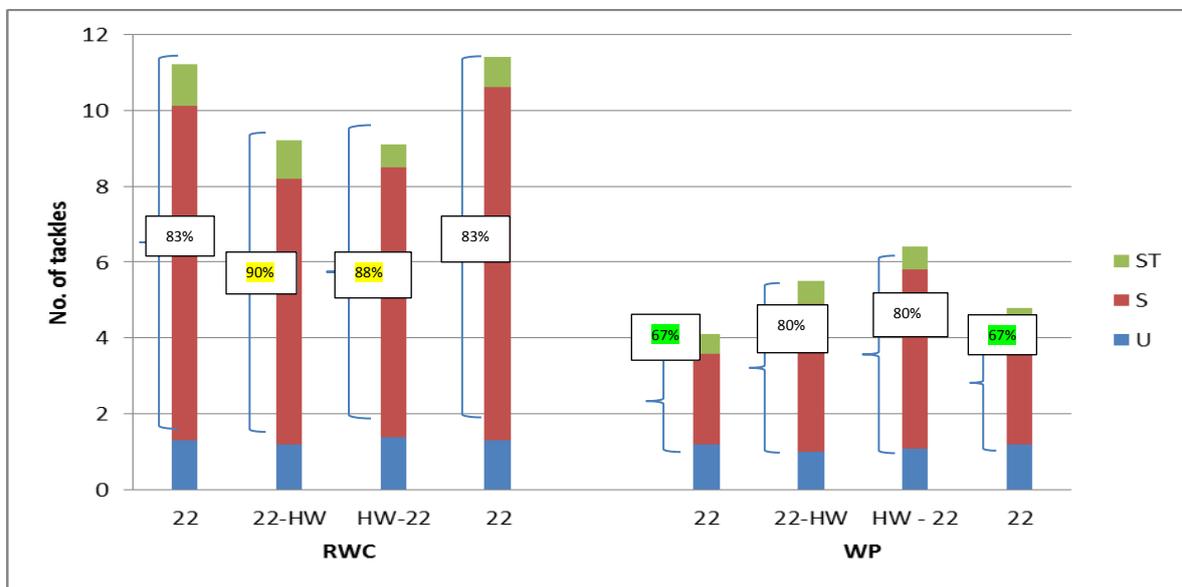


Figure 3: A graph to show areas on the pitch where a chop tackle has been performed

Figure 3 shows that there is a higher success rate in performing a chop tackle by an elite athlete as it generates more successful tackles and turnovers compared to the semi-professional players. As highlighted in yellow the two areas that are providing the best results is displayed from 22-HW to HW-22, even though the number of chop tackles are less the execution of the skill is higher. An elite player is most successful at turning the ball over from 22-HW at a 13% successful turnover rate which produces the highest reading by comparison to a semi-professional rugby player. The completion of a chop tackle is far lower in the WP but still a significant successful turnover rate has occurred. The two columns labelled '22' (green) in WP have a high percentage reading of 9.6% and 8.9% successful turnover rate but the

completion and turnover of the tackle shows both are at 67%. These values show that the elite player in RWC can execute a successful chop tackle and also turnover the ball but taking into consideration the semi-professional still has a good successful turnover rate but devalues the chop tackle when the successful completion of a tackle is a far less percentage Figure 3 shows no significant difference between RWC and WP performing a chop tackle as the compared readings are greater ($p>0.05$) than the significant value which shows there is no effective results between the two.

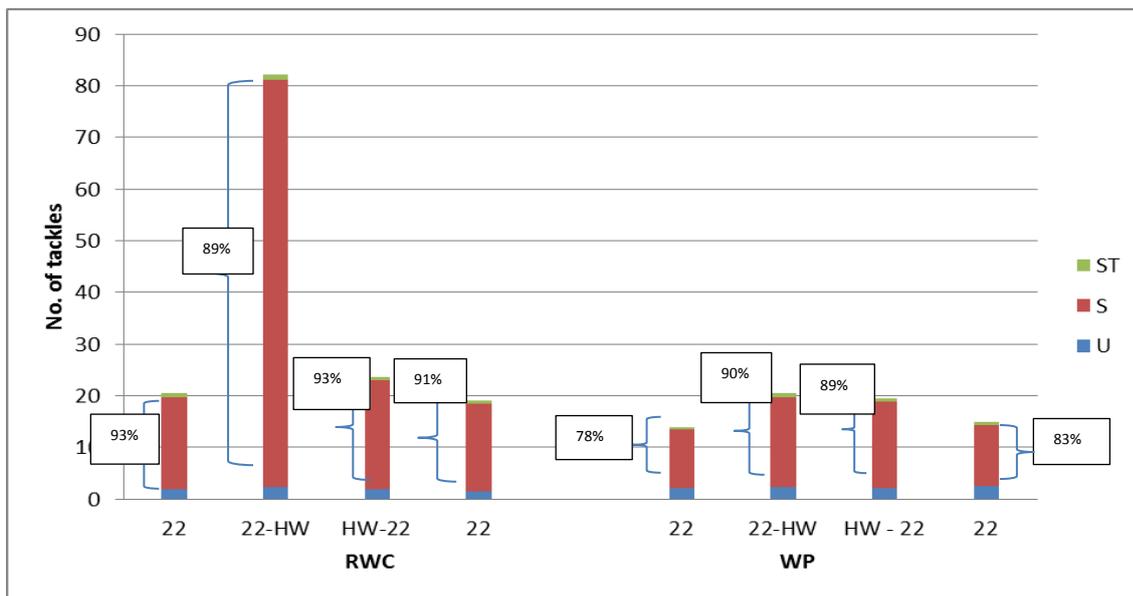


Figure 4: A graph to show areas on the pitch where other tackles are performed

Figure 4 represent other tackles performed on the pitch with regards to the success. As the graph shows, both levels of performances complete the most tackles in the centre part of the pitch with a high completion percentage. In comparison of the two different models the RWC has a higher percentage of successful turnover overs and successful tackle completion rate. Although the percentage of success rate is considerably high, it provides a minimal successful turnover rate. The statistical analysis showed that there is no significant difference in successful turnovers in all areas of the pitch ($p>0.05$). Although there was no significant difference in the data the values in the graph indicate that the most number of tackles were made by elite players highlighted from 22-HW. In regards to the WP the statistical analysis shows the numbers of tackles performed were indicated in the middle of the field with high success percentages of 90% and 89%. . Figure 4 shows that there is a significant

difference ($p < 0.05$) between RWC and WP performing a ST, S other tackle with the difference being conducted in areas 1 ($p = 0.005$), 3 ($p = 0.49$) and 4 ($p = 0.27$). Therefore these shows the other tackles are more effective in those areas of the pitch by both levels of performances

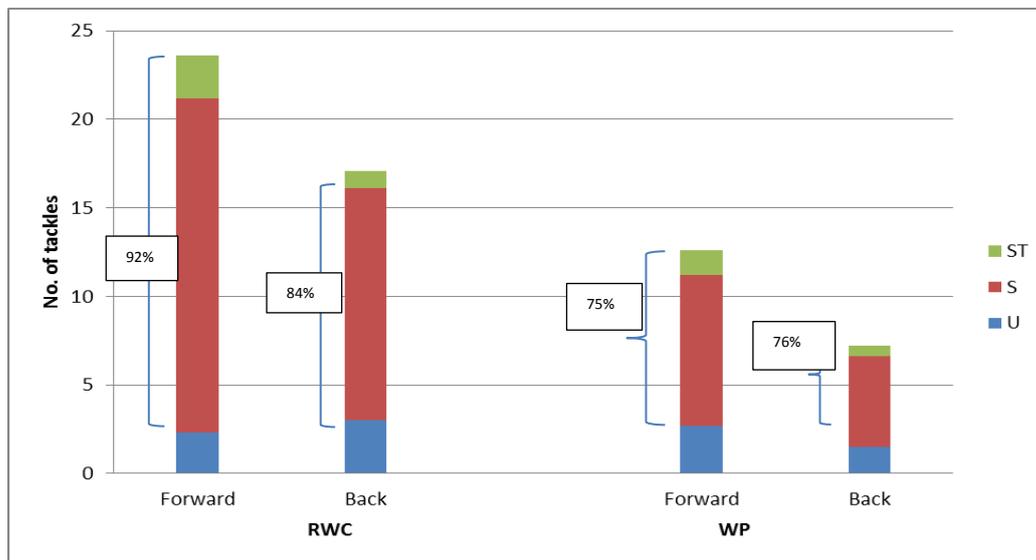


Figure 5: A graph to show number of chop tackles success rate performed by both forwards and backs

Analysing the figure 5 it shows that a chop tackle was conducted more times by a forward in the RWC compared to a forward in WP. The ST, S in the RWC is 92% success rate equated to 75% in WP. This shows that the semi-professional forwards don't execute the high risk skills efficiently. Readings are near enough similar when a successful turnover has been implemented with RWC to have a success rate of 10% in relation to 9% in WP. The percentage of the back in completing a chop tackle is significantly a higher percentage in RWC with 84% and comparing that to WP at 75%. There is a reoccurrences with the implementation of a successful chop tackle to be performed in WP but readings show a 9% successful turnover rate performed by the backs which is higher than RWC. There is a significant difference between ST, S forward chop tackle ($p = 0.000$) shows that forwards are more effective at applying the skill compared to the backs as their readings are showing no significant readings as they are above ($p > 0.05$).

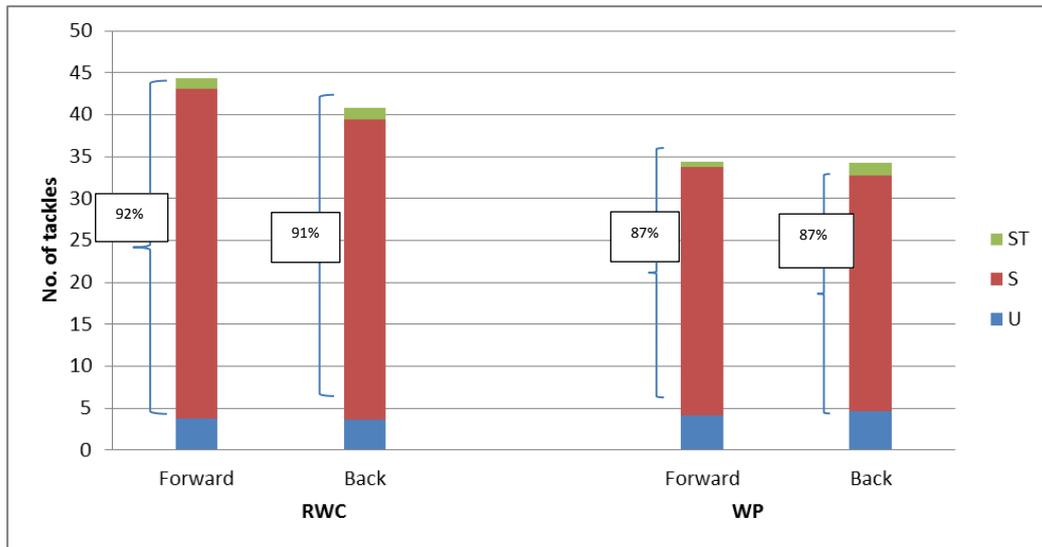


Figure 6 A: graph to show number of other tackles success rate performed by forwards and backs

Figure 6 shows the other tackles performed ST, S by a forward and back in both level fields. The completion of the skill is more successful in RWC with forwards having the highest number of tackles with a 92% completion rate. The completion percentages are significantly higher in performing an other tackle but the turnover success rate is minimal as this type of tackle is low risk and low reward which doesn't maximise the chances of turnover ball.

A Wilcoxon test was used to find comparison between RWC and WP. There is a significant difference ($p < 0.05$) showing that WP forwards are more effective at performing the chop tackle as ST and ST, S show that the frequency of the tackle produces more turnovers ($p = 0.001$). Therefore there is no significant difference between the chop and other tackle in the backs. In RWC the forwards were more efficient at producing a successful turnover with a significant difference of ($p = 0.03$). Overall ST, S rate in RWC the backs were more efficient in performing the skill ($p = 0.005$). These results were produced by comparing chop tackle and other in two selected fields to find the significant readings.

CHAPTER FIVE: DISCUSSION

Discussion

5.1 Introduction

This study was conducted to focus on the influences of a chop tackle compared to other various tackles in two levels of rugby, elite and semi-professional. According to previous literature by Hughes and Barrett (2002) explained relevant to the discussion area that an important recognition is placed upon choosing the specific indicators because it would then make the results comparable and valid. James et al. (2005) and Parson and Hughes (2001) had similar behavioural points which was relevant to this study because the performance indicators used to produce and clarify the data were very similar. Their results help the study due to the similarities of what indications and actions an elite and semi-professional rugby player should perform in the tackle contact area. These studies were very similar to this discussion as Parson and Hughes (2001) discussed and compared two different level types and James et al. (2005) analysing and comparing the different types of tackles used, so therefore the use of data from different studies will provide evidence of difference in this discussion. Previously stated in the literature the objective was to design a system capable of recording specific data from a rugby union match and be able to recognise the different tackles being performed whether that is a chop or other type for elite and semi-professional rugby union. A discussion will provide different variables that have been investigated and explain the reason of why they may exist.

5.2 Chop Tackles

Moody (2002) explained the mechanics of a chop tackle is to hit the player below knee height and wrapping your arms around their legs to stop them from running. This will bring the player straight to the floor allowing a fast and easy tackle contest. By collecting data and analysing certain information from figure 1 the statistics show that elite players made the most tackles of 127 compared to 88 on average per game in semi-professional. In interest of the chop tackle and how well it is being executed the elite players in RWC are performing a chop tackle with 31% of all tackles made and 22% in WP. By observing figure 1 it indicates that the elite player produces more tackles in chop and other compared to the semi-professional. This study is requested not to significantly find the overall chop completion rate and then compare the two level effects but who produces the most successful chop tackles.

The completion of successful turnovers (ST) and successful tackles (S) are combined and the percentage of success is considerably higher at 88% in elite rugby union. The down fall to a lower 76% in semi-professional rugby could be to the lack of skill execution of the individuals and the different selected roles they play in the game and their responsibilities. The chop tackle is a high risk skill, O'Donoghue (2013) explains that high risk performances are often seen in score line states where the performer is likely to lose the game if some risks are not taken. The high risk performance which is a chop tackle has a higher chance of providing a turnover but can lead to a missed tackle and therefore a try could be scored. Due to the high risk to produce the tackle it leads to a higher successful turnover rate. In the RWC elite players can perform the chop tackle at a high success with a percentage of 88%. The chop tackle is deemed to be more successful to turnovers but has more chance of being a missed outcome. This is labelled as being a general phenomenon in sport, Ashe (1981) explains that there are risks associated with opportunity in tennis because if a player is winning 40-love do you attempt to serve an ace on second serve. This results in conceding a double fault and losing the point or winning the game with an ace. Generally sports have specific tactics as part of the strategy and strengths of the teams and individuals. As summarised, if the team is less than one score down with minutes to play and the opposition have the ball, in relation to the data produced do you 'play safe' and perform another tackle or perform a high risk play to perform a big tackle and turnover the ball to try and win the game. Therefore if you are winning the game, the other tackle would be best suited because it is completed more successfully and is the best option. According to O'Donoghue (2013) in soccer when a team is down by a goal with minutes left of the match the goalkeeper may possibly come up for a corner. This however can risk in letting a goal in because the team can just kick the ball down field or the goalkeeper can act as another attacking forward and score or equalise in the final minutes of the game. That can relate to the decision and tactics implemented by taking the high risk opportunity of a chop tackle to try and gain a turnover, but if it is not successful it leads to a missed tackle and the opposition team could go and score or gain yards down field. Analysing all areas of sport shows that performances which require a high risk, high opportunity policy can be beneficial with a high success rate can produce successful turnovers that are more frequent than other types of tackles. Analysing the data, a chop tackle is more significant in RWC because it produces

more effective turnovers. This is due to higher skill execution of the performance due to a high and more experienced level effect. The chop tackle isn't only relevant to the tackler, it develops the ball carrier. If the team is winning at half time the opposition will try and perform chop tackles to enhance their turnover rate. So therefore when players and coaches are in this situation they should analyse the situation because more chop tackles are going to be made therefore a lot more missed tackles will occur. According to O'Donoghue (2013) some actions may be rehearsed and predictable while others may be improvised team plays. In terms of preparation and the rehearsed plays that are going to be made, if the situation where the opponent misses a chop tackle and the ball carrier makes the break, everyone should be aware and help capitalise on the break. Hughes (1998) explains that players need to be mindful of their own performances and technical capabilities when selecting a pass in soccer. This highlights that most of the chop tackles made by WP players are in the centre half of the field, this is because when they do miss a tackle it can be covered by the full back or a tracking player which then minimises the chance of a try being scored. Holzman and Lewin (1973) talk about how close you play an opponent in basketball depends on him. With relation to basketball if the attacker is not very good at shooting long distance you can hold back then get tight to him around the hoop, if he is a playmaker you got to stay close to defend him. This is very similar in relation to a chop or other tackle because if the attacker is quick and agile there smaller chances of completing an effective chop tackle but if the ball carrier is physically bigger and running straight the best option is to chop tackle and then try and get an effective turnover.

5.3 Combination Effect.

The level effect has produced some significant differences by performing a Mann Whitney U test between tackle in RWC and WP. The overall performances of tackles were greater in RWC. There was almost 50% more on average, this could be because of the increased intensity and tempo of the individual games, in the Rugby World Cup you have all the best players in the world playing at this level. Other points to consider are the increase in tackles could be because players are quicker to react and more effective at closing down the space which also makes the defences in teams a lot stronger. Elite players have a better knowledge of the game and can anticipate plays and set moves in the game so they know where to position

themselves on the pitch to perform a tackle. Mitchell-Taverner (2005) reveals that performance depends on the strength and weaknesses of teams, this relates to the dip in chop tackles performed by WP players as they could be suffering from fatigue and by performing a high risk skill they can potentially miss a tackle and it results in a try. Therefore by performing a safe tackle they limit their chances of missing a tackle which could result in a try being scored against them or losing field possession. The proportion of chop tackles in RWC is a third of the overall compared to a quarter of chop in WP. This study shows that when the chop tackle has been completed it does produce more turnovers, being a high risk high reward performance. O'Donoghue (2013) talks about the association of skills linked with high prospects of success have a greater risk and 'playing safe' utilises the opportunities for success. To elaborate from that point, it shows that by performing a chop tackle it has more potential to produce more success, that's why the elite players perform it regularly and successfully. The other tackle in rugby has a smaller chance of producing turnovers but is easier to perform, O'Donoghue (2013) talks of this as "playing safe". By referring back to past literature, Sasaki et al. (1999) found similar results that explain the difference in quality of the opposition can lead to an influence in performance. So in the RWC when the top nations play each other, the games are a lot tighter and higher risks are required to make high opportunities. Consider games like Wales v South Africa, Ireland v Australia, Wales v France and New Zealand v France, all those games were close and the losing team was only one score behind. Meaning they needed a high risk performance which resulted in a high reward to regain the ball and attempt to win the game. O'Donoghue (2008) explained similarities in his results when looking at tennis and the quality of opposition and how playing seeds around you can generate yourself to produce more effective shots but high risk game winning shots need to be implemented to gain vital points. More chop tackles were performed in the RWC due to the fact that each game was considerably a one scoring game and teams needed to perform high risk tackles to have a greater chance of getting the ball back. In the WP there was a bigger margin between winning and losing so it was not necessary to perform a chop tackle. The tournament structure of the RWC is an elimination process and shows that if a team is losing they have to take high risks otherwise they will go out and not progress to the next round. There is a big margin between the two level fields in their successful outcomes of a chop tackle, this could be down to the professionalism of the elite

athletes because they are fulltime players they have more time to experience and optimise their full potential in mastering the skill. Even though in RWC the ball carriers are more developed and perceive higher skills to combat the increase in tackling it must be narrowed down to the training environment and training drills implemented on a daily basis. It has been discussed that in RWC more tackles are performed, analysing Figure 3 it shows that more chop tackles performed by elite players are being performed in both 22 areas. This could be publicised as being risky near their own try line because a high risk chop tackle will have a better chance in a turn over but with an unsuccessful attempt it would lead to a try. In WP they seem to produce the more amount of chop tackles in the midfield with a 88% ST,S rate. Semi-professional players are able to take the risk of performing a chop tackle more in the centre half of the pitch because if the tackle is missed there would always be a player who is covering the role of full back or scrum half to make the last chance tackle. The analysis of a chop tackle is far more strategic in RWC than in WP because the elite players produce the high risk tackle to enable more turnovers when the opposition are on their own try line. In relation to other tackles far more were being performed from 22-HW in RWC as WP seem to be more evenly distributed. Easier tackles are being made which produces a lower missed tackle rate and is the best possible tackle to stop momentum and retain territorial advantage by the defending team. Overall forwards completed a lot more tackles throughout the games producing higher success percentages in RWC. It also shows that forwards make more other tackles than backs but the statistics even up in the WP.

O'Donoghue (2008) devised a similar study by comparing different levels of performance and sectioning them because you could analyse the performance in a better way. This study examined both RWC and WP, the findings showed that RWC forwards are just as effective at performing a chop tackle along with other tackles. The WP forwards perform a ST,S rate of 87% for other tackles made but their execution of a chop tackle is not as successful. There is a dip in performance for semi-professional players in the WP, the reasoning behind this could be different players experience training at different levels and that the consequences are a lot bigger if a tackle is missed in RWC than in WP. Individuals could possibly pick their battles as they choose which tackle to perform due to the risks involved if the skill is not completed successfully. When WP players execute the chop tackle they may find

that the risk is covered and a covering player can aid them if they fail. Therefore the elite athletes in RWC produce a chop tackle more effectively and frequently in their own 22's, in comparison to O'Donoghue (2013) stated that in cricket some shots are vital to score four or six runs have a high risk because they can either miss and get bowled or caught out or hit the ball over the boundary and gain the higher reward. This is due to the tactical awareness of teams in RWC as they perform more chop tackles to exploit and gain a successful turnover but if the tackle is missed they can lose points through try's being scored. Pearce and Hughes (2001) experienced similar findings when conducting their study of analysing the influence of a substitution was either positive or negative and how it contributed to the overall performance. This can be related due to the fact of how effective a chop tackle is and how a positive or negative tackle influences decision making of players in RWC and WP. Coaches can analyse and identify relevant information that can be used in different training drills to make tackles more effective.

The tactics implemented by players when performing a specific tackle should be identified and the individual should assess the situation in relation to the outcome of a success and unsuccessful chop tackle. If a game was tight and there was a situation where there was one score difference more than likely and chop tackle would be attempted, this is because it is a high risk high reward skill that can be very beneficial when completed correctly as it provided more frequent turnovers. More often this skill was implemented by the elite athlete as they had more knowledge and experience in performing the tackle.

CHAPTER SIX: CONCLUSION

Conclusion

6.1 Conclusion of the Study

The purpose of the study was to investigate the effectiveness of a chop tackle in rugby union between two selected fields, elite and semi-professional. The study analysed different variables that were identified as the correct indicators to adopt the correct data which would be valid and contribute to further knowledge.

Overall the best type of player to perform a successful chop turnover was a forward playing in RWC because they were significantly greater in producing turnover all ($p < 0.05$). This could be dependent on the professionalism of the player and extreme physical state of the individual. It was identified that the other tackle was more common and had a higher success rate, however overall when the chop tackle was successfully completed it produced more frequent turnovers mainly in the RWC. Other tackles performed are significantly greater in the areas 1, 3 and 4 on the pitch ($p < 0.05$).

6.2 Recommendation for Practice

This study has shown that elite players are more effective at successfully completing a chop tackle and have the ability to produce more turnovers using this skill. This is down to the types of training drills that are implemented in their training sessions and therefore they have more time to master the skill because they train daily. Players who aspire to make the next step and play elite rugby union need to make more tackles and also have the skill set to evade tackles by the use of footwork and hand offs because there are more tackles on average per game in RWC. Players and coaches need to consider the use of different types of tackles and where they should be used throughout the game. This is due to the tactics and game state whether a team is winning or losing.

6.3 Future Research

This study has produced solid information and has provided research that other people can build upon. The useful theoretical data explains that tactics with greater opportunities have a greater risk in themselves. The top end of elitism and semi-professional rugby could be analysed over a broader scale, including women's

rugby, university rugby and second tear international teams like Georgia, Romania and Russia. Teams at risks use different tactics and attempt the use of different tackles because the score line is a different state. The difference in game state will influence the different factors to producing different types of tackles.

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