Factors to Heighten Success of Ball Acquisition in Kick-off and 50m Restart Kick Play in Rugby Football

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The objective of this research is to clarify the factors to heighten success of ball acquisition in kick-off and 50m restart kick (KO) play from the viewpoint of the kicking side. For that purpose, the process of ball acquisition of the kicking side was divided into three play elements: the kick, the contest for the ball, and the prompt ruck/maul formation after KO. A total of 448 KO plays in 43 world class matches were taken as samples and correlation between performance in each play element and ball acquisition rate of the kicking side was quantitatively analyzed. It can be concluded from the results of analysis as follows: 1) In order to increase the success rate of ball acquisition in KO play with respect to the kicking side, an important factor is for the kicking side to take some action against the ball earlier than the opponent at an aerial contest for the ball. 2) In order to realize it, an important factor is to create situations where the receiving side cannot employ the lifting play. It is also implied that in field practice, an effective way to improve the performances in KO play is to devise tactics and to have players achieve a mastery of techniques to realize the factors to heighten success of ball acquisition in KO play which have been made clear in this research.

Keywords: rugby football, kick-off, restart kick, performance analysis, world class match

1. Introduction

In rugby football, a play starts by a drop kick at or behind the center of the halfway line at the beginning of a match¹, at the beginning of the second half after the half-time interval, or after a score by either team. These kick-offs and 50m restart kicks (hereafter "KO") and ball contest plays directly tried after these kicks are, as assumed from the descriptions of technical guidance books (e.g. Winder, 1990; Williams & Hunter, 2000.; NSWRU, 2004), set plays, which tend to have been neglected compared with scrums and line-outs. Nakagawa et al. performed a series of game analysis studies and showed that success of ball acquisition in a KO play resulted in significantly longer occupying time of the area after it and that this led to significantly higher score acquisition rates (Nakagawa & Miyao, 1995, 1997; Nakagawa, 2006). They demonstrated that the KO play is an important set play in rugby games¹. It is worth noting that KO plays are observed at the beginning of first and second half or immediately after a point scored (a point allowed), which are key timings to win the match (Nakagawa et al., 2002; Nakamoto & Nakagawa, 2002). Accordingly, it should be aware that KO is not a mere starting (or

¹ In this paper, the term ‘game’ is used as an abstraction expressing the rugby football played in accordance with the formal rules, and ‘match’ used as a realization of competition.

² Before 2001, a kick at the start and restart of a game was called a kick-off. The 2002 revision of the rules defined a kick-off as a kick at the start of a game and restart after half-time, and renamed a kick after a score including a drop-out kick into a restart kick (IRFU, 2002). For restart kicks, 50m restart kick is used to discriminate kicks at drop-out. 50m restart kick is not a term presented in the rules but used in the game analysis report published by the International Rugby Board (IRB, 2006a, 2006b), so it was followed in this study. This article integrated the terms of kick-offs and 50m restart kicks by using an abbreviated term of "KO" to avoid complication in terms. KO and direct ball contest plays following KO are called KO plays.
restarting) play but an important set play, which greatly affects the outcome of matches.

Heightening the success of ball acquisition in KO plays, therefore, is an important issue for the practice of rugby games. Recent rugby games have an average of only 30% success at most in ball acquisition by the kicking side in short KO plays even for world class teams (IRB, 2006a, 2006b; Nakagawa, 2006). This means that ball acquisition is not easily achieved. In the meantime, the rate of success in ball acquisition by the ball-in side exceeds 80% in scrums and line outs, which are the same kind of set plays (IRB, 2006a, 2006b; Nakagawa, 2006). The differences in the rate between them may suggest that KO plays can be improved.

Through sound understanding of factors to heighten the rate of successful ball acquisition in KO plays in matches, we have to devise tactics and practice for a mastery of techniques. Yet with the rapid advancement of aerial lifting techniques of the receiving side, only a few publications refer to KO plays in recent years, and factors to heighten the success of ball acquisition in recent KO plays have not been clarified.

A method explaining factors for heightening success in a specific play is to analyze plays based on the observation faculties of a good coach. Especially in games like rugby, which show complex and dynamic play aspects, such a subjective analysis has its limit (McKenzie et al., 1989). In the meantime, there is a method of describing factors for higher success rates by dividing the process of a relevant play into some important elements and quantitatively analyzing the relationship between performance in each play element and eventual success in the play (Hughes & Franks, 2004). Such quantitative play analyses are applicable to all kinds of ball games, and several studies have been reported in rugby as well. For instance, by applying quantitative play analysis, McKenzie et al. (1989) have explained heightening factors for the success of contact play of the ball carrier; Sayers & Washington-King (2005), for break play of the ball carrier; and Akutagawa (2007), for contact turnover play. However, no research has been reported in KO plays.

The objective of the present study is to clarify heightening factors for the success of ball acquisition through a quantitative analysis by focusing on the process of ball acquisition by the kicking side in rugby KO plays.

2. Method

2.1. Sample

The subject of this research was KO plays in recent world class rugby games. Since world class rugby games are summit-level games attainable ever under the rules of the time, they are expected to present role-model plays for rugby games of all levels. For the purpose of this research, a total of 43 representative team matches of tri nations, six nations and test matches from June 2004 to March 2006 were studied. Eight national teams were represented: three from the southern hemisphere (Australia, New Zealand, and South Africa) and five from the northern hemisphere (England, France, Ireland, Scotland, and Wales). We collected KO plays found in the matches. There were 448 KO plays sampled from recorded pictures, whose action was clearly recognizable as such. In the world rankings from June 2004 to March 2006 announced by the International Rugby Board, seven of the eight sampled teams placed in the best 8 through the two consecutive years and the remaining one team placed among the top ten. From these results, these 448 KO plays are considered to be appropriate as KO play samples representing recent world class rugby games.

The point spread in these sampled matches was a maximum of 34, the mean 10.7, and the standard deviation 8.4, meaning that the matches were fairly competitive. The samples did not include those in heavy rain, which could have greatly affected the quality of the plays.

2.2. Definition of Success of Ball Acquisition by the Kicking Side

The success of ball acquisition by the kicking side in KO plays included all kinds of acquisition of the ball possession in KO plays (e.g. direct acquisition of KO ball, acquisition of penalty kick by a foul occurring at a ball contest subsequent to KO, acquisition of the right to put a ball in scrum and line-out). Since KO plays include ruck/maul plays, which are promptly formed after KO, the success of ball acquisition by the kicking side in KO plays included, a) the kicking side capturing the ball after KO, then retaining the ball after ruck/maul formation, and b) the receiving side capturing the ball after KO, then losing the ball to the kicking side after
ruck/maul formation.

2.3. Analysis Method

Sampled KO pictures from the video tape or DVD of all matches were recorded as data on the proprietary record form (Figure 1).

First the process to successful ball acquisition by the kicking side was considered and three play elements of 1) kicks, 2) ball contests, and 3) prompt point\(^3\) formations from KO were picked out as the play element necessary for the analysis. The following analyzing items were determined for these three elements.

### 2.3.1. Analysis Item on Kicks of KO

For the item on kicks of KO, kick drop areas (kicking areas, hereafter) were studied; the areas were divided into three sections of the receiving side: receiving side 10m and over ~ 22m, receiving side 22m and over ~ 5m before goal line, receiving side 5m before goal line and over ~ in goal (Figure 2). At each area, we recorded the points where a ball kicked in KO touched a player or was dropped on the ground. Each area was defined as R10~22, R22~G5, and RG5~ING. The area on the half way line and over ~ receiving side 10m was HL~R10.

Although the height of kicks of KO may be associated with success and failure of ball acquisition, this analysis using video pictures was excluded because the height could not be measured. This is one limitation of this research.

### 2.3.2. Analysis Items on Ball Contests

For the item on contests of kicked balls, there were two target items: 1) aerial contests by the kicking side and 2) lifting play by the receiving side. For aerial contests by the kicking side, first we recorded if the kicking side made an aerial contest to the kicked ball after KO. We also checked KO aerially contested by

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\(^3\) This is a group close play of ruck and maul formed by contact of both team's players. When such a group play occurs, an offside line is formed. Hence it functions as a tactical point.
the kicking side to see if the kicking side took action on the ball earlier than the receiving side. At this time, the side which first aerially played by touching the ball was regarded as the first to take action on the ball. As for lifting plays by the receiving side, we recorded if a lifting play was used when the receiving side made an aerial Contest to the kicked ball in KO. If there was no contest, we checked if a lifting play was used at an aerial capture of the ball. This lifting play denotes that one or two lifters lift and aerially hold one ball catcher to acquire the ball at the highest position.

Then, the outcome of aerial ball contests was recorded and categorized into five types: 1) direct catch by the kicking side, 2) direct catch by the receiving side, 3) the ball left loose, 4) foul by the kicking side, and 5) foul by the receiving side. For 3) the ball left loose, we checked which side, the kicking side or the receiving side, acquired the loose ball. If there was a knock-on or ball out in touch during a contest of a loose ball, we checked which side took the subsequent acquisition of the right to put the ball into a scrum and to throw in at a line-out. If there was no ball contest after KO, the same recording procedure was done.

2.3.3. Analysis Items on Prompt Point Formation after KO

With or without a ball contest, prompt point formation after a capture of a KO ball by the kicking side or receiving side was examined. If a point was promptly formed, the position was recorded according to the area division shown in Figure 2. At that time, if the player who captured the KO ball contacted the opponent within three steps and made a point formation, it was considered to be a prompt point formation from KO, and if the player ran more than four steps, it was defined as a direct run attack from a ball acquisition in KO play. In the play mode at a prompt point from KO, the data were categorized into 1) ruck formation or 2) maul formation. When a maul formed once but then was broken into a ruck, the mode at this point was considered to be a ruck. If the opponent intentionally broke a maul drive into a ruck after a maul formation, the mode was a maul.

Prompt point formation after KO was sampled to check if the ball was acquired by the kicking side or the receiving side. The mode of ball acquisition at that time was divided into four types: 1) direct acquisition, 2) penalty kick acquisition, 3) acquisition of the right to put the ball into a scrum, and 4) acquisition of the right to throw in at a line-out.

2.4. Data Processing Method

First, in the analysis result on kicks of KO, the rate of KO play occurrences and the rate of ball acquisition by the kicking side were obtained for comparison in each of the 3 kicking areas.

In ball contests, the contest conditions at the aerial contest for the kicking side and lifting play conditions of the receiving side were combined to make 4 contest conditions. In each contest condition, the rate of ball acquisition by the kicking side was obtained for comparison according to each kicking area. Then, only the KOs with an aerial contest by the kicking side were divided into two cases: 1) success and 2) failure in taking action on the ball first by the kicking side. Then the rate of ball acquisition by the kicking side was obtained for comparison according to the receiving side having or not having a lifting play in this success or failure of taking action on the ball aerially. In addition, the rate of KOs with an aerial contest in which the kicking side succeeded in taking action on the ball first was obtained for comparison according to the receiving side having or not having a lifting play.

Next, the result of aerial ball contests was divided into five event categories: 1) direct catch by the kicking side, 2) direct catch by the receiving side, 3) the ball left loose, 4) foul by the kicking side, and 5) foul by the receiving side. Then the rate of their occurrences according to the aforementioned four contest conditions discriminating the kicking area was obtained and compared. The result of ‘without an aerial contest after KO’ was processed in the same
way by seeking the rate of occurrences according to the aforementioned five categories for comparison. Further, in KOs with an aerial contest by the kicking side, the rate of ball acquisition by the kicking side after a contest for a loose ball was obtained for comparison according to success or failure in taking aerial action on the ball by the kicking side before the receiving side.

In the analysis result of prompt point formation, the condition of which side took the ball in making the point formation and the condition of play mode, ruck or maul, at the point were combined. Then the ball acquisition rate by the side which took the ball was obtained for comparison in each area of point formation.

Lastly, the events of occurrences which resulted in the success of ball acquisition by the kicking side were classified and the frequency and percentage were sought.

The level of significance was set to be 5% in the statistical tests. The differences of each rate were tested by Fisher’s Exact Test. To test differences in the rate among more than three groups, Ryan’s method was used to make multiple comparisons by adjusting the level of significance.

### Table 1 The rate of occurrence and the ball acquisition rate of the kicking side, for each kicking area

<table>
<thead>
<tr>
<th>Kicking areas</th>
<th>Occurrence rate</th>
<th>Ball acquisition rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>R10~22</td>
<td>55%</td>
<td>24%</td>
</tr>
<tr>
<td></td>
<td>(246/448)</td>
<td>(60/246)</td>
</tr>
<tr>
<td>R22~G5</td>
<td>45%</td>
<td>6%</td>
</tr>
<tr>
<td></td>
<td>(201/448)</td>
<td>(12/201)</td>
</tr>
<tr>
<td>RG5~ING</td>
<td>0%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(1/448)</td>
<td></td>
</tr>
</tbody>
</table>

N.B. Frequency data are shown in ( ), * corresponds to p <.05

### 3. Results

#### 3.1. Objectivity of the Analyzed Data

The values of κ coefficient obtained in each analysis item ranged from .862 to 1 with the mean being .934. This vindicated enough objectivity in the result of analysis of the present research (Landis & Koch, 1977).

#### 3.2. Analysis Result on Kicks of KO

Table 1 shows the result of the rate of occurrences and the ball acquisition rate by the kicking side in the three kicking areas. The table shows that the rate of occurrences of KO in the R10~22 area exceeded 50% and the rate in the R22~G5 area exceeded 40%. That in the RG5~ING counted only once in total. Therefore, KO in the RG5~ING area was excluded from further analysis. In the ball acquisition rate in KO by the kicking side, there was a clear difference between the kicking areas of R10~22 and R22~G5. KO in the R22~G5 kicking area observed an extremely low rate of 6% ball acquisition by the kicking side. From the result of the statistical test, the rate of occurrences as well as ball acquisition by the kicking side had significant differences in the areas of R10~22 and R22~G5.

#### 3.3. Analysis Result on Ball Contests

Table 2 shows the rate of ball acquisition by the kicking side in four combined conditions of aerial contests by the kicking side and lifting play by the receiving side according to the kicking area. Because of difficulty in data interpretation in the rate whose
Table 2  The ball acquisition rate for the kicking side, in combined conditions of the contest conditions at the aerial contest for the kicking side and the lifting play conditions of the receiving side, for each kicking area

<table>
<thead>
<tr>
<th>Kicking areas</th>
<th>With an aerial contest</th>
<th>Without an aerial contest</th>
<th>Significance in difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Without lifting play</td>
<td>With lifting play</td>
<td>Without lifting play</td>
</tr>
<tr>
<td>R10~22</td>
<td>42%&lt;sup&gt;a&lt;/sup&gt; (31/74)</td>
<td>23&lt;sup&gt;b&lt;/sup&gt; (18/80)</td>
<td>13&lt;sup&gt;c&lt;/sup&gt; (7/52)</td>
</tr>
<tr>
<td>R22~G5</td>
<td>– (0/2)</td>
<td>– (1/3)</td>
<td>4% (8/189)</td>
</tr>
</tbody>
</table>

N.B. Frequency data are shown in ( ), * corresponds to $p < .05$

Table 3  Correlation between the ball acquisition rate and success or failure in taking action on the ball for the kicking side at an aerial contest (KO for the kicking area R10~22)

<table>
<thead>
<tr>
<th>With an aerial contest</th>
<th>Kicking side taking action on the ball earlier than the opponent</th>
<th>No action taken by the kicking side earlier than the opponent</th>
<th>Significance in difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without lifting play</td>
<td>57% (17/30)</td>
<td>33% (14/43)</td>
<td>*</td>
</tr>
<tr>
<td>With lifting play</td>
<td>– (6/7)</td>
<td>16% (12/73)</td>
<td>*</td>
</tr>
<tr>
<td>Total</td>
<td>62% (23/37)</td>
<td>22% (26/116)</td>
<td>*</td>
</tr>
</tbody>
</table>

N.B. Frequency data are shown in ( ), * corresponds to $p < .05$

frequency was less than ten, their values were not shown (all treated as such hereafter). The table found in the R22~G5 kicking area that 94% (189/201) of KO had no aerial contest by the kicking side and no lifting play by the receiving side. Ball acquisition by the kicking side in this case showed an extremely low rate of 4%.

In the meantime, in case of KO in the R10~22 kicking area, 63% (154/246) had an aerial contest by the kicking side. The rates of ball acquisition by the kicking side were 32% (49/154) ‘with an aerial contest’ and 12% (11/92) ‘without an aerial contest’. The rate of ‘with contest’ was significantly higher than ‘without contest’. If taking account of a lifting play by the receiving side, it was confirmed that in the case of ‘with an aerial contest’ by the kicking side, the rate of ball acquisition by the kicking side in ‘without lifting play’ by the receiving side was almost twice as much as ‘with lifting play’. Ball acquisition by the kicking side marked the highest rate of 42% when there was an aerial contest by the kicking side while the receiving side did not use a lifting play. This rate of 42% was significantly higher than the other three contest conditions in the statistical test. The ball acquisition rate, however, did not significantly differ among the other three conditions.

Next, using KO with an aerial contest by the kicking side in the R10~22 kicking area, the ball acquisition rate by the kicking side was examined according to success or failure of the kicking side in taking action on the ball earlier than the receiving side. Table 3 shows the result according to the condition of lifting play (with or without) by the receiving side. The table observed significantly higher rate of ball acquisition when he kicking side took aerial action on the ball earlier than the receiving side in both conditions with and without lifting plays by the receiving side. In total the rate of
Factors to Heighten Success in Kick-off Play in Rugby

When we calculated the rate of KO plays taking action on the ball earlier than the opponent while the kicking side was making an aerial contest, as shown in Figure 3, the receiving side without a lifting play counted 41%(30/73) and with lifting play 9%(7/80). This means that the lifting play by the receiving side had a great effect. The difference in the rate between them was statistically significant.

In the analysis result of aerial contests, KO kicked in the R22~G5 area was excluded because 94% did not have any contest. Only KOs kicked in the R10~22 area were analyzed. Table 4 shows the result. The table acknowledged the fact that in the rate of occurrences of direct catch by the receiving side, ‘without an aerial contest’ by the kicking side was significantly higher than ‘with an aerial contest’ in both conditions of with and without lifting play. In case of ‘with an aerial contest’ by the kicking side, the rate of occurrences of direct catch by the receiving side was significantly higher ‘with lifting play’ than ‘without lifting play’. In the meantime, the rate of occurrences of loose ball had an opposite tendency, in which ‘with an aerial contest’ by the kicking side showed significantly higher rate than ‘without an aerial contest’. Especially the rate of occurrences of loose ball ‘with an aerial contest’ by the kicking side showed 58% when there was no lifting play by the receiving side, which was significantly higher than the other three contest conditions. The rate of occurrences in ‘direct catch by the kicking side’, ‘foul by the kicking side’, and ‘foul by the receiving side’ observed small values without any significant differences among the contest conditions.

Next, using only KO having an aerial contest, the
result of comparison between success and failure in taking aerial action on the ball earlier by the kicking side is shown in Table 5. In the table the rate of ball acquisition by the kicking side after a contest for a loose ball was examined.

The ball acquisition rate includes not only direct acquisition of a loose ball but acquisition of the right to put a ball into a scrum and line-out occurring at a contest of a loose ball. In total, the ball acquisition rate by the kicking side from loose ball contests was almost 50% (without lifting play by the receiving side: 21/43, with lifting play: 13/27). However, the table suggests that, in the ball acquisition rate by the kicking side at an occurrence of a loose ball, when the kicking side could take aerial action on the ball earlier than the receiving side, the rate got a higher value than ‘no action.’ In ‘with lifting play’ and in the total of the two lifting play conditions, the differences of the rate were significant.

### 3.4. Analysis Result on Prompt Point Formation from KO

In prompt point formation from KO, to promptly form a point after capturing a KO ball, 65% (26/40) was gained by the kicking side while 57% (205/361) by the receiving side. Both sides formed it in more than half of the events with or without ball contests. Table 6 shows the ball acquisition rate by the side which brought the ball in each point forming area. For the result the condition of which side brought the ball and the condition of play mode at the point were
combined. The table demonstrates that regardless of whether the kicking side or receiving side brought the ball to form a point, the side which brought the ball acquired the ball almost 100%. Turnover at the prompt point from KO hardly occurred. Also in the play mode of ruck and maul at the point, there were no notable differences in the ball acquisition rate.

3.5. Result of Classification of the Successful Ball Acquisition Play

Lastly, Table 7 shows the result of classification of the actual successful plays of ball acquisition by the kicking side. From this table, we knew that almost half of the successful plays by the kicking side were point formations or direct attacks after capturing the loose ball occurred at aerial ball contests. It was followed by ball acquisition due to fouls by the receiving side at aerial ball contests. These two accounted for almost 80% of the whole. Ball acquisition by direct catch of KO balls was hardly successful, accounting for only 7%.

### Table 7  The breakdown of occurred events which resulted in the success of ball acquisition for the kicking side

<table>
<thead>
<tr>
<th>Successful ball acquisition plays</th>
<th>Freq.</th>
<th>Per ct.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition of the loose ball after an aerial contest: Ruck 18, Direct attack 14, Maul 1</td>
<td>33</td>
<td>46%</td>
</tr>
<tr>
<td>Acquisition of the right to the use of PK and scrum due to a foul by the receiving side at an aerial contest</td>
<td>22</td>
<td>31%</td>
</tr>
<tr>
<td>Acquisition of the right to the use of PK and scrum due to a foul by the receiving side at the ruck/maul formed promptly after KO</td>
<td>5</td>
<td>7%</td>
</tr>
<tr>
<td>Acquisition of the ball after a ruck following a direct catch of the KO ball</td>
<td>5</td>
<td>7%</td>
</tr>
<tr>
<td>Acquisition of the right to the use of a line-out due to touch by the receiving side catcher of the KO ball</td>
<td>3</td>
<td>4%</td>
</tr>
<tr>
<td>Acquisition of the right to the use of a line-out due to touch of the ball left loose at an aerial contest</td>
<td>3</td>
<td>4%</td>
</tr>
<tr>
<td>A turnover of a ruck formed by the receiving side promptly after KO</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>72</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

4. Discussion

4.1. Factors to Heighten the Success of Ball Acquisition

Looking at the ball acquisition rate by the kicking side according to the kicking area (Table 1), it was recognized that KO in the R22–G5 area observed very low value of 6% in ball acquisition for the kicking side. In addition, the ball acquisition rate by the receiving side without contest or lifting play had very high value of 90% (181/201) (Table 2). KO kicked into a deep area of the receiving side like R22–G5 may come from the recent quite popular KO tactic of long kicking (Nakagawa, 2006, 2007), or KO tactics of long kicks to the opponent by giving up ball acquisition. This is thought to reflect the aforementioned analysis result. For the purpose of the present research, which tried to clarify factors to heighten the success of ball acquisition in view of the kicking side, analysis results relating to KO plays in the R10–22 kicking area might be important.

From the analysis result of the phase of ball contests of KO plays in the R10–22 kicking area (Table 2), ball acquisition by the kicking side observed a significantly low rate of about 10% unless the kicking side had an aerial contest. This implies
the importance of aerial contests to KO balls to heighten the success of ball acquisition by the kicking side. The result of more detailed analysis of aerial contests (Table 3) suggested that at an aerial contest when the kicking side took action on the ball earlier than the receiving side, the rate of ball acquisition by the kicking side significantly improved, accounting for 62% in the total. These analysis results elucidated that earlier action on the ball than the receiving side after an aerial contest is an important factor for the kicking side to heighten the success of ball acquisition.

In the meantime, the rate of ‘earlier aerial action on the ball by the kicking side’ significantly differs depending on the lifting use conditions (i.e. with or without lifting use) by the receiving side. If the receiving side contested without a lifting play rather than having the play, the rate yielded approximately 30% higher value (Figure 3). Accordingly, an aerial contest by the kicking side without a lifting play by the receiving side enhances the possibility for the kicking side to realize action on the ball earlier than the receiving side at a contest. This may be an important factor to heighten the success of ball acquisition by the kicking side. It reflected on the highest value when the kicking side had an aerial contest while the receiving side did not have a lifting play (Table 2) in comparison with the ball acquisition rate by the kicking side in combined conditions of contests by the kicking side and lifting use by the receiving side.

In an aerial contest with lifting use by the receiving side, it can be said that the success of ball acquisition may surely heighten if the kicking side can take action on the ball earlier than the opponent at an aerial contest. Yet, the success to realize earlier action on the ball than the opponent at an aerial contest was found to have an extremely low rate of 9% (Figure 3). In this respect, an aerial contest by the kicking side occurring concurrently with a lifting play by the receiving side may be meaningful to heighten the success of ball acquisition by the kicking side. Yet, it may not be a very important factor.

It was clarified that an aerial contest of the kicking side without a lifting play of the receiving side could heighten the rate of ball acquisition not because of higher occurring rate of direct catch by the kicking side or fouls by the receiving side, but because of fewer direct catches by the receiving side and higher occurrence rate of loose ball instead (Table 4). Thus, ball acquisition occurring from a contest of a loose ball is the key to heighten the success of ball acquisition rate by the kicking side. The result of the classification of the successful ball acquisition plays (Table 7) also implies the importance of ball acquisition from a loose ball contest.

The rates of ball acquisition by the kicking side and the receiving side from the loose balls occurred at the contests were even unconditionally. ‘The kicking side could take action on the ball earlier than the receiving side at an aerial contest’ yielded a higher value than ‘the kicking side could not take action’. Significant differences were observed in the condition of having a lifting play by the receiving side and in the total of the combined conditions of ‘with and without lifting play’ by the receiving side (Table 5). Creating a loose ball at a point advantageous for the kicking side through earlier aerial action on the KO ball than the opponent may cause the results. This is thought to be a specific finding showing the importance of aerial action on the ball earlier than the opponent to heighten the success of ball acquisition.

At a point of prompt formation from KO, if either the kicking side or receiving side took the ball and made point formation, or if a point was formed in either mode of ruck or maul, the side which brought the ball could acquire the ball almost 100% (Table 6). This shows the high skill level of world class players in a group close play in the phase of KO plays when they are on the ball bringing side. Further, the success or failure of KO ball acquisition is largely determined before this phase. Thus, the play element of post-KO prompt point formation cannot find heightening factors for the success of ball acquisition by the kicking side.

In summary of the observations obtained from the analysis results of this research, an important factor to heighten the success of ball acquisition by the kicking side in KO is earlier action on the ball than the receiving side by aerial contests. To realize it, the kicking side has to contest aerially when the receiving side does not make a lifting play.

4.2. Practical Significance

In conclusion, the most notable significance in practice obtained in this research is how to create tactics, in which the receiving side cannot effectively use a lifting play at a contest. This is the useful finding for heightening the success of ball acquisition...
of the kicking side. KO, as Greenwood (2003) indicated, is a typical state, in which stereotypical procedures are repeated to avert risks in rugby games. Nakagawa (2007), focusing on KO aiming direct ball acquisition, described that even in world class matches, almost 70% of the matches found conventional KO plays, in which the forward line up on one side and kick the ball toward the opposing forward standing face to face with them. Nevertheless, from the result obtained in the present analysis, such common KO plays easily permit the receiving side to use lifting plays and offer the kicking side only a limited chance of ball acquisition. On this account, for the kicking side to heighten the success of ball acquisition, dependence on conventional common KO tactics should be reversed and KO tactics preventing the receiving side from using effective lifting plays be devised and executed for a rewarding outcome.

To sum up, the present research has presented two important technical subjects for rugby plays. They are indispensable to heighten the success of ball acquisition by the kicking side in KO plays. One is provision of KO kicks enabling sufficient chances of aerial contest by the kicking side. This has already been pointed out (Winder, 1991; Greenwood, 2003). The result of the present analysis has confirmed this importance. Accurate and constant kicks fully permitting aerial contests are not easy. For example, in the analysis result of the present research regarding the phase of ball contests (Table 2), even when the receiving side did not have a lifting play in the R10~22 area, the kicking side did not have aerial contests in almost 20% of the all KO plays (52/246). In many cases KO kicks were not those with which the chaser could make an aerial contest. This suggests that even in world class rugby, the kicking skill of KO can be improved.

The other is the improvement of the ability to win 1 to 1 aerial ball contests if the kicking side can create tactical situations in which the receiving side cannot effectively employ a lifting play and if the kicks are accurate enough to enable aerial contests by the kicking side. This research demonstrated that when the receiving side used a lifting play, the possibility of success was not much; but if the kicking side took aerial action on the ball earlier, the rate of the success of ball acquisition improved. The results suggested that the receiving side cannot always execute a lifting play in a perfect form in real events. From a different viewpoint, the results may also attach importance to improvement in the ability to contest for an aerial ball. However, no training method has been established for heightening the ability to win the aerial contests in field practice. Hence, further practical research is necessary in this area.

References

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