Defense performance Analysis of Rugby Union

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ABSTRACT

Sasaki, K. (2015). Defense performance Analysis of Rugby Union. *J. Hum. Sport Exerc., 9*(Proc2), pp.S753-S755. Various performances profiling studies contributes to solve a problem and to verify concrete tasks in practical sport field (O'Donogue, 2005). As an acknowledgement of common and individual behaviours would be needed to present a more accurate representation of players' contribution to performance (James, Mellalieu, & Jones, 2005), to raise the evidence to discuss defence, the current study focused on defensive turnover situations in the game and applied the social network analysis to organizational strategy. We focus on the defense performance analysis of rugby union. Rugby World Cup (RWC) is a rugby union tournament contested every four years between the top international teams and is one of the largest international sporting events in the world, surpassed in scale only by the FIFA-WC, The Olympics, and the Tour de France. The Seventh tournament is going to held in Japan in 2019. **Key words**: RUGBY, ANALISIS, WORLD CUP.

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REGRESSION ANALYSIS

For understanding the defense performance towards the final score balance, a regression analysis was done (independent variables; 'tackle success ratio: 0-100(%)', 'frequencies of the missed tackles', and 'frequencies of crucial turnover get', dependent variable; 'final score balances'). This allows comparison of results with past study (Sasaki, 2005). High regression values were obtained in this analysis (R2=0.77, SE=221.34, F=17.75, p<0.01). The findings presented in Table 1 indicate that the three independent variables of defense performance were contributing factors for final score balance. One point up in the 'tackle success ratio' (for example: 79% to 80%) could contribute positive 1.43 points in the final score balance. An increasing of 1 in the frequency of 'missed tackle' could contributes negative 2.28 points in final score balance. And increasing in frequency of the crucial 'turnover get' by 1 could contribute positive 9.23 points in the final score balance. Furthermore, a statistically significant correlation was found between the independent variable 'frequencies of turnover get' and the index 'final score balance'. Practically speaking, the index of 'turnover get' comparing with tackled situations (tackle success or not, missed tackle or not) would have a more positive effect towards the final score balance. So the next focus was on tackle turnover situations.

Table 1. Regression equation between "score balance" and the defence performance In 2011 Rugby Word Cup.

$$\text{Score Balance} = 1.43{*}TS - 2.28{*}MT + 9.23{*}TOG - 116.43$$

	1.43*TS	2.28*MT	9.23*TOG	116.43
S =>	(2.16)	(1.88)	(2.89)	(205.69)
t =>	(0.66)	(-1.21)	(3.20)**	(-0.56)

R^2 =0.77, SE=221.34, F=17.55**, **p<0.01

TS; Tackle success Ratio, MT; Missed Tackle, TOG; Turnover Get

NETWORK ANALYSIS

Network analysis has been developed in communication-network studies as a graph theory within mathematical studies. The network has structure of both the vertex (players' positions) and the edge line (co-operation between team-mates in match; two man tackle turnover) and the network analysis presents a descriptive index of the graph structure and statistics those mean which position plays a central role of two man tackle turnover.

Data were derived from 20 matches of close and balanced scores (under 20 points: results from cluster analysis according to game final score differences of 40 pool matches in 2011RWC) in as referring past study structure (Luis Vas, 2011). Network analysis in current study would clarify the evidence of dynamic balance mechanism of defensive co-operation of team mates in close and balanced match. To understand the two man positional relation structure, the frequencies of two man tackle turnover were plotted in the adjacent matrix (15 * 15) and the density centrality by the frequencies of turnover and eigenvector centrality by the intimacy relationship within positional co-operations were calculated.

Degree means the frequency of links incident upon a position (vertex) and calculated for all the vertexes in an adjacency matrix. The network map was completed by the degree centrality of a vertex "v". Degree centrality is as follows:

$$C_D = \frac{\sum_{i=1}^{V} [C_D(v*) - C_D(v_i)]}{(n-1)(n-2)}$$

C_D: degree centrality, v*: vertex with highest degree centrality, v_i: actual degree centrality, i; vertex number, V: total vertices, (n-1)(n-2); max value when the graph contains one central vertex to which all other vertexes are connected (a star graph) (Figre.1).

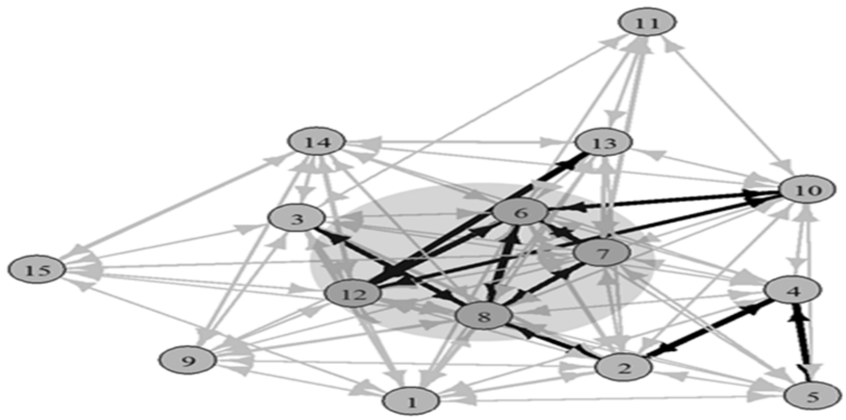

Figure 1. Double tackle contributor's mapping by force-directed placement (degree centrality) at 2011 Rugby World Cup close games in pool matches (total: bold black lines; more than 5 times double tackle turnover partners).

(Test Course Navette 10.9 min and Hoff test = 10 min), but these data are inconsistent with those presented by Nassis et al., who found no significant differences when assessing the test also: Course Navette: 190.4 ± 9.3 and 192.0 ± 7.6 to Hoff (Nassis et al., 2010). However, regarding the similarity in lactate levels, reduced heart rate could be associated with a lower speed of movement given by the need of dribbling the ball during the test.

The main finding of this study is the relationship between the Hoff test and Course Navette test to evaluate aerobic fitness of players, which further strengthens the use of tests that are closer to real game conditions for each one of the sports activities. However, it is necessary to strengthen the studies with a larger population and at different competitive levels in the process of validation of these tests.

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