A COMPARISON OF RUGBY SKILLS, PHYSICAL AND MOTOR ABILITIES AND ANTHROPOMETRIC DATA OF NATIONAL-, PROVINCIAL- AND SCHOOL TALENTED YOUTH RUGBY PLAYERS

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Abstract:

International competition becomes more challenging as competitors reach top performances at an increasingly younger age. Scientific methods of identifying and developing talent in youth sport are not widely used at present, especially in rugby. The aim of this study was to compare the rugby specific skills, physical and motor abilities and anthropometric data of national-, provincial- and school talented youth rugby players. A number of 382 under twelve players were tested on a total of 29 tests. The results indicated that the national players performed the best in most of the rugby skills and physical and motor abilities. This group also showed a more appropriate talent for rugby than the other groups. The results available can also help a coach in the selection of talented rugby players. However, more research is needed for more accurate predictions.

Key words: talent identification, youth rugby players, rugby skills, physical and motor abilities, anthropometric data.

EIN VERGLEICH DER RUGBY-BEZOGENEN FERTIGKEITEN MIT DEN KÖRPERLICHEN UND MOTORISCHEN FÄHIGKEITEN SOWIE ANTHROPOMETRISCHEN DATEN BEGABTER JUNGER RUGBYSPIELER AUF DEN SCHUL-, PROVINZ- UND NATIONALEBENEN

Zusammenfassung:

Internationale Wettkämpfe werden immer mehr herausfordernd, als Sportler in immer jüngerem Alter ihre Höchstleistungen erreichen. Die wissenschaftlichen Methoden zur Identifizierung und Entwicklung begabter junger Sportler werden zur Zeit nicht weit angewendet, besonders nicht im Rugby. Das Ziel dieser Untersuchung war, die rugby-bezogenen Fertigkeiten mit den körperlichen und motorischen Fähigkeiten sowie anthropometrischen Daten von den begabten jungen Rugbyspielern auf den Schul-, Provinz- und Nationalebenen zu vergleichen. Die Stichprobe von 382 Spielern, noch unter 12 Jahren, wurde mittels 29 Tests geprüft. Die Ergebnisse zeigten, dass die Nationalspieler in meisten rugby-bezogenen Fertigkeiten sowie in den körperlichen und motorischen Fähigkeiten die besten Leistungen erzielten.

In dieser Gruppe war auch die entsprechende Begabung fürs Rugby mehr als in den anderen zu merken. Die vorhandenen Ergebnisse können den Trainern bei der Selektion begabter Rugbyspieler helfen. Immerhin bedarf es weiterer Untersuchung um es genauer voraussehen zu können.

Schlüsselwörter: Identifikation der Begabten, junge Rugbyspieler, rugby-bezogenen Fertigkeiten, körperliche und motorische Fähigkeiten, anthropometrische Daten

Introduction

The term talent can be defined, according to Du Randt (1993:293) "the aptitude manifesting itself in a certain direction, exceeding an average standard and being not yet fully developed". According to Du Randt (1993:295) talent identification and development in South Africa are at present, because of the exigencies of the transitional phase in the country, uncoordinated and under-researched, although there is a definite need for such activities. Talent identification in other countries, in contrast, especially in the so-called former communist bloc, is the order of the day. Potential sportsmen and women are already identified early on, following which they receive specialized training in order to represent their countries. In South Africa talent identification in accordance with scientific methods is relatively unknown and is at present done largely on the basis of the child's achievements during competition and the trainer's judgement (Du Randt & Headley, 1993:298).

Related literature, however, does refer to some principles which are applicable during talent identification, and a few of these will be quoted. According to Harre (1982) specific problems experienced in talent identification include the validity of tests, variable growth rates, trainability of talent determinants, lack of sports science, co-operation, uncertainty about selection age, lack of longitudinal studies, lack of conceptual models and the lack of norms. According to Régnier et al. (1992) it is also important that each type of the sport should determine its own specific requirements before the testing of talent can occur. Régnier et al. also state that a discriminant analysis should be compiled in the course of talent identification. The purpose of this is to measure the suspected performance determinants of a sample of the pool population and of a sample of the target population. Thereafter, a discriminant analysis should be conducted in order to identify the combination of variables that best discriminate between both populations and to produce the classification equation to determine the percentage of similarity between a member of a new sample of the pool-population and the members of the original target population.

According to Du Randt (1993:23) the age and the size of the population selection are also important variables in talent identification. She also maintains, in this regard, that "the first attempt to identify talent takes place, usually, at the age of 8 to 10 years and in some cases earlier, in the form of mass screening. The selection criteria are not too stringent as the emphasis is rather on risking the inclusion of untalented children than excluding potential talented children". The age at which one should start with sports-specific selection also cannot be determined rigidly from the literature. The researcher also mentions that further evaluations in accordance with a test battery are needed for application to the children selected.

Du Randt (1993:32) also refers to the so-called conceptual model of Régnier as a very good basis for when and how talent identification should occur. Three phases are distinguished, viz. 1) after exposure to a balanced and motor development programme the first attempt at identification takes place (usually at the age of eight to ten years). Observation and field tests evaluating general movement and physical ability are used. 2) The second talent identification takes place 18 to 24 months later, usually at the age of eleven to twelve years, through the use of observation, field tests of performance and the rate of improvement, taking into account the child's biological age. 3) Final talent identification takes place around the age of fourteen years. These athletes are then subjected to an elite sports programme.

From literature it also emerges that there is a great need for standardized tests which can be used for talent identification. Countries such as the former German Democratic Republic were more advanced during the early seventies than most in respect of selection procedures. However, Rowley (1987) noted that even there the need for better validated and more comprehensive screening methods were recognized. Jarver (1981) also identified the lack of reliable test batteries and access to more sophisticated laboratory testing. Du Randt and Headley (1993) suggest, however, that initial selection on the basis of motor and physical abilities should be done in conjunction with sports specific skills. The researchers also indicate that "as far as could be ascertained little or no valid South African norms for identified talent predictors exist. This is a serious drawback in the investigation of talent identification".

In the sphere of rugby Pienaar and Spamer (1995, 1996) have in the past few years conducted various scientific studies in order to establish a battery of tests according to which 10 - 12 year old potentially talented players can be identified to take part in further development programmes. The first phase of the talent identification programme was based on the Russian model (Jarver, 1981), as well as the Australian model (Woodman, 1985). Both these models suggest that initial selection should take place between 8 and 10 years. The second phase that comprises the development of skills and regular testing, takes place between the ages of 11 and 12. The third phase (13 and 14 years) includes the re-evaluation of talented players which should be evaluated for further selection. In the above-mentioned study by Pienaar and Spamer (1995), after a period of two and a half years during which identified talented young boys followed a special skills development programme, statistics were

achieved, as revealed by the inclusion of players in the provincial Craven Week Team. The result confirms that identified talented young players who subsequently followed a development programme, did indeed become top achievers in their age-group.

Although this battery of tests was the first of its kind for 10 year old rugby players, other kinds of sports have, for a considerable time, had specific profile tests to identify talent. A few examples are: athletics (Alabin *et al.*; 1980 and Dick, 1979), swimming (Blanksby, 1980), rowing (Shakespear, 1980) sprints (Tabatchink, 1979), long-distance running (Travin *et al.* 1982) and cycling (Telford, 1980). Most of these profile tests are founded on the demands made on elite sportspersons.

Pienaar and Spamer's (1995) study shows that 10 year old rugby players can be classified reasonably successfully according to talent for further development and the achievement of success. The model that these authors used for their research, was based on the conceptual model for the detection of talent in sport as used by Salmela and Régnier (1983). The possible reasons why a certain number of identified players did not achieve the same measure of success as the others in the group, while both groups followed the same development programme, have not been properly investigated.

Aim of the study

The aim of this study was to compare the rugby specific skills, physical and motor abilities and anthropometric data, obtained from a literature, of national-, provincial- and school talented youth rugby players. According to the best results obtained by the different groups a norm scale was compiled for further use by rugby coaches to evaluate the results of their players.

Method of investigation

The battery of tests used to monitor the results of the players was the same as that used by Pienaar, and Spamer (1995). The rugby skills tests were: passing forward for distance, passing for accuracy (over a distance of 7 m and 4m), catching while running forward, kicking for distance and kicking-off for distance.

The physical and motor ability tests, viz running speed, agility run, vertical jump, sit and reach, flexed arm-hang and speed endurance, are all related to components of rugby, and are recognised internationally (Pienaar, Spamer and Steyn, 1998). Ten anthropometric variable measurements according to the protocol of the International Association for the Advancement of Kinanthropometry (Eston and Reilly, 1996), which include stature, body mass, skinfolds, girths and diameters, were used.

The different groups that were used to compare results, were the 1998 Nike Elite group of the South African Rugby Football Union (N=36, national team), the 1996 North West Craven Week primary group (N=18, provincial team), the 1989 national Craven Week for primary schools (N=237, provincial team), the 1998 North West Craven Week primary development group (N=42, provincial team), the 1996 North West Development group, that are players from the deprived groups (N=6, school team), the 1997 Khutsong development group, that is black players from the townships (N=43, school team), as well as results, if available, from international data.

All the above mentioned groups were of the age group of 11-12 years. Although the groups were tested on different occasions (from 1996 to 1999), the same battery of tests, the same research co-ordinaters and the same apparatus were used. The detail of the different groups viz method of research, statistics used, results and conclusions were documented in the following literature: Spamer et al, 1999; Pienaar and Spamer, 1995, 1997; De Ridder, 1993 and AAHPER, 1996; Van der Merwe, 1997.

Results

The results are presented as follows:

- a comparison of rugby skills and motor and physical abilities between the different groups.
- a comparison of anthropometric variables between the different groups.

Only arithmetic means were compared. For the purpose of this study it was not necessary to look at significant differences. The latter can be found in the literature as referred to.

Table 1: Descriptive statistics (arithmetic means and standard deviations) for twelve year old rugby players with regard to rugby skills, physical and motor abilities

VARIABLES	NWG 1996 (N=18)		DG 1996 (N=6)		KDG 1997 (N=43)		NWDG 1998 (N=42)		SARFU 1999 (N=36)	
	0	s	0	s	0	s	0	*s	0	*s
1. Forward pass for distance (m)	19.1	2.3	17.1	2.0	14.8	0.8	11.7		6.2	
2. Forward pass for distance: 7m	26.6	3.1	23.7	2.9	13.9	2.6	16.6		14.4	
(score) 4m	4.7	1.6	3.3	2.1	6.5	1.0	2.7		3.7	
3. Running and catching (score)	18.4	1.8	17.3	2.4	6.6	0.9	16.0		8.9	
4. Kick for distance (m)	31.8	5.2	28.3	3.5	24.5	1.1	25.6		29.6	
5. Kick-off for distance (m)	27.8	7.2	26.2	3.1	21.4	2.6	22.3		31.5	
6. Speed (45.7m)	6.8	0.7	6.9	0.4	7.2	0.3	10.1		6.5	
7. Agility run (sec)	7.7	0.6	8.7	0.4	13.1	1.2	8.1		6.9	
8. Sit and reach (cm)	4.4	2.4		10.4	1.8	8.8	3.0	3.7		
9. Flexed armhang (sec)	26.2	6.3		28.3	7.4	26.4	3.1	22.5	41.9	
10. Vertical jump	40.5	5.4		40.9	2.9	28.7	2.4	24.9	40.1	
11. Speed Endurance (% decrease)	9.0	1.3		12.0	1.6	9.5	0.5	9.9	5.2	

___ This presents the best score
* Standard deviations not available
NWG = North West Craven Week
KDG =Khutsong Development Group
DG =Development Group
NWDG = North West Development Group
SARFU = South African Rugby Football Union

Rugby skills and physical and motor abilities

In five of the tests the best results were obtained by the SARFU (national) group. The tests were running and catching ($\bar{x}$=18.9 score), speed ($\bar{x}$=6.5 sec.), agility running ($\bar{x}$ =18.9 sec), kicking-off for distance ($\bar{x}$=31.5 m) and flexed arm hanging ($\bar{x}$=41.9 sec). It is quite obvious that the abilities of this group as regards specific rugby skills such as running, catching a ball, kicking speed and agility were very good. These results could be expected because this is the national elite group. The North West Craven Week group (NWG) of 1996 performed the best in forward pass for distance ($\bar{x}$=19.1 score), forward pass for accuracy over 7 metre ($\bar{x}$=26.6 score) and kicking for distance ($\bar{x}$=31.8 m). The players from the underpriviledged groups performed the best in the sit and reach test ($\bar{x}$=10.4 cm), vertical jump ($\bar{x}$=40.9 cm) and forward passing for accuracy over 4 metres ($\bar{x}$=6.5 score).

An aspect which can receive attention in the SARFU group is passing (distance and accuracy). The reason why the SARFU group did not do as well in the tests as the NWG group may be because the SARFU group has up to now received less continuous practice in rugby skills. There is no doubt that they have the ability, but they need more intensive practice in specific skills such as accurate passing. Although they do possess the ability they do need more intensive practice in specific skills such as accurate passing. Should the group be tested again at a later stage they should show better results. Especially accurate passing (over 7 metres) can improve.

The group that performed the poorest is the North West Development group (NWDG) of 1998. Although this group is a talented group it must be born in mind that results were measured before their development programme started. All the other groups followed a development programme whereafter tests were conducted. The results of the NWDG will only be available after completion of their development program at the end of 2000.

Table 2: Descriptive statistics (arithmetic means and standard deviations) for twelve year old rugby players with regard to anthropometric characteristics

VARIABLES	NWG 1996 (N=28)		DG 1996 (N=6)		KDG(N=43) 1999 (N=36)		CWG 1989 (N=237)	
	0	s	0	s	0	*s	0	*s
1. Body mass (kg)	53.6	8.6	48.1	5.1	56.0		55.0	
2. Stature (cm)	165.3	9.3	163.0	2.7	165.6		163.9	
3. Triceps SF (mm)	9.4	3.6	6.8	6.8	9.3		10.8	
4. Subscapular SF (mm)	6.5	1.4	6.3	1.7	8.9		6.6	
5. Supra-spinale SF(mm)	6.8	3.8	5.0	0.6	7.5		8.3	
6. Abdominal SF (mm)	8.8	4.2	7.2	2.4	11.0		11.0	
7. Front thigh SF (mm)	14.4	4.4	12.8	3.1	13.0		15.0	
8. Calf SF (mm)	9.5	3.4	7.2	2.4	10.2		11.1	
9. Upper arm girth (cm	27.4	3.0	26.0	2.4	28.1		28.0	
10. Calf girth (cm)	34.0	2.5	33.3	1.8	3.3		34.5	
11. Humerus breadth (cm)	7.4	1.3	4.6	0.3	7.2		6.4	
12. Femur breadth (cm)	9.6	2.2	9.5	1.4	9.8		8.8	
13. % Body fat	14.9	2.4	11.3	2.1	15.4		15.0	
14. Fat mass (kg)	8.0	-	5.4	-	9.0		8.5	
15. Lean body mass (kg)	45.6	-	42.7	-	47.0		45.5	
16. Endomorphy	2.2	-	1.7	- -	2.5		2.6	
17. Mesomorphy	4.1	-	2.8	-	5.2		4.2	
18. Ectomorphy	3.6	-	3.1	-	3.3		3.2	

* Standard deviation not available

NWG = North West Craven Week
DG = Development Group
KDG = Khutsong Development Group
NWDG = North West Development Group
SARFU = South African Rugby Football Union

The results also proved that the groups from the under developed group (DG 1996 and KDG 1997) are not on the same level as those of the other groups. That is due to the fact that rugby was introduced to those groups on a professional base only 10 years ago.

Anthropometric data

In general, the SARFU group had a more appropriate morphology for rugby, than the other three groups. This is due to the fact that they had the largest mesomorphic component of all four groups - their mesomorphic component was even larger than that of the elite Craven week group (CWG) of 1989 (n=237). This is a very important aspect, if it is kept in mind that the mesomorphic component represents bone and muscle mass in the body. Although there were certain individuals whose mesomorphic component was less than the rest of the group, the mesomorphic component was acceptable for most of the players. In the reports on the individual players, recommendations have been made, which the players must adhere to, to improve their mesomorphic component.

When the percentage body fat for the four groups is compared, the SARFU group compared not very favourably with the elite CWG of 1989. It is so, that when too much fat is carried by the player, it has a negative effect on fitness, agility and speed. It is therefore important that if more weight is desired by these players that the mass gained must be muscle mass and not fat mass!

Conclusions and recommendations

Research on young rugby players is still in a preliminary phase world-wide and South Africa is undoubtedly the pacesetter in this regard. Comparisons with other existing results show that the SARFU group (national players) is an above-average group and can thus be seen as a talented group. Attention needs to be given, however, to certain skills (like passing the ball) and the fat percentage that is relatively high for certain front row players.

It is important to keep in mind that no research results are currently available that indicate that a player who shows mature talent

at the age 11 and 12, will necessarily show talent as a senior. Results regarding this matter will only be available in the year 2000. (A longitudinal study of six years is currently running to give more clarity on this matter). For this reason the monitoring of the SARFU group is important for researchers and future predictions.

Physical build at age 12 is not of crucial importance but it may be an indication of later achievements.

According to the results of the different groups the following norm needs (12 year old) can be completed that can help rugby coaches responsible for youth players to evaluate the players performance. Most of the groups that were used are talented players and the scores represent the best values for all the groups.

This norm scale can also help the coach to identify shortcomings in the abilities of the players, which need attention and further training.

Rugby skills and physical and motor abilities:

Passing for distance:	19.1 m
Forward pass for accuracy (7m):	26.6 score
Forward pass for accuracy (4):	6.5 score
Running and catching:	18.9 score
Kick for distance:	31.8 m
Kick-off for distance:	31.5 m
Speed:	6.5 sec
Agility run:	6.9 cm
Sit and reach:	6.9 cm
Flexed arm hang:	41.9 sec
Vertical jump:	40.9 cm
Speed endurance: (% decrease)	5.2 %

Anthropometric data:

A rugby team consists of 15 players and each position has its own requirements concerning antropometric data. Variables like body mass and structure will differ from position to position (De Ridder, 1993). The international tendency is that players of all the different positions became bigger and stronger. This tendency is not so prominent among youth players but still certain anthropometric variables would be for the advantage of youth players (Pienaar and Spamer, 1995).

It is recommendation is that the anthropometric data of the SARFU group give a norm that can be used (table 2). For more detail about specific positions, the relevant literature can be used. The same principle applies for specific rugby skills like kicking (Craven, 1997).

Research on talent identification on youth rugby players is still limited and more research is needed. Rugby is played in more than 120 countries and the world Rugby Cup is the fourth biggest sport event in the world. This study is an attempt to get more research data on the game of rugby and specific to youth players.

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