South African Journal for Research in Sport, Physical Education and Recreation, 2009, 31(2):109-118.
Suid-Afrikaanse Tydskrif vir Navorsing in Sport, Liggaamlike Opvoedkunde en Ontspanning, 2009, 31(2):109-118.
ISSN: 0379-9069

TALENT IDENTIFICATION AND DEVELOPMENT IN YOUTH RUGBY PLAYERS: A RESEARCH REVIEW

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ABSTRACT

Several South African studies were conducted during the past twelve years (1995 to 2007) as part of a research project on Talent Identification and Development. The main objective of this project was to compile the profile of a potential talented and elite youth rugby player, primarily within the conceptual research model proposed by Salmela and Régnier (1983). Hundreds of elite youth rugby players, within the age range 10 to 19 years old, were tested on several anthropometric, physical and motor abilities, game specific skills, and injury epidemiology. The research project was extended to England and New Zealand, and the data compared with that of South African teams. Other possible variables of talent identification, including proprioception, balance, plyometric strength, injuries, and ethical behaviour, were also investigated. The aim of this research review is to provide scientific evidence concerning the profile of an elite youth rugby player, thereby providing variables, assessment tools, and recommendations to coaches, selectors, administrators, and scouts, which may be used in the identification, selection, and development of future elite rugby players. Hopefully, this research review will furthermore stimulate future research on talent identification and development within youth team sport.

Key Words: Talent identification and development; Youth rugby; Research review; Anthropometric; Physical and motor abilities; Game specific skills; Injury epidemiology.

INTRODUCTION

During the past twelve years several studies were conducted in South Africa on the profile and characteristics of elite youth rugby players. Different components of talented, gifted, or elite rugby players were investigated at age levels that varied from 10-years to 19-years old. As part of a research project on *Talent Identification and Development* of youth rugby players that was launched in 1994, hundreds of youth elite rugby players were tested on several anthropometric, physical and motor abilities, game specific skills and injury epidemiology, in an attempt to compile the profile of a potential talented youth rugby player.

The aim of the first part of the research project (1994 to 1999) was to develop a practical model to identify talent among ten-year old rugby players (Pienaar *et al.*, 1998). The elite rugby players that took part in this study were monitored over a period of seven years to verify the correctness of talent identification predictions (Pienaar & Spamer, 1998a; Spamer & Hare, 2001a). During the late ninety's, several studies were conducted on the topic of talent identification, including prediction functions for different age groups (Pretorius, 1997; Van Gent, 2003), norm scales of performance for different age groups and positions (Spamer,

2000; Spamer & Winsley, 2003b), as well as a battery of tests that could be used by coaches to identify potential talented youth rugby players (Hare, 1999; Van Gent, 2003).

In the beginning of 2000, the research project on talent identification and development in youth rugby was extended to England and New Zealand (Spamer & Winsley, 2003; Du Plessis, 2006). Other possible variables of talent identification were also researched. Hattingh (2003), Erasmus (2006), and Steenkamp (2006), investigated the influence of rugby injuries on the performance of elite rugby players age 15-19. Another study concentrated on the influence of proprioception, balance and plyometric strength on the occurrence of injuries within youth rugby (Serfontein, 2006). The ethical behaviour of top rugby players was also investigated (Spamer, 2005).

The research on talent identification of youth elite rugby players accumulated a repertoire of knowledge that can be useful to coaches, administrators**,** and support staff, while stimulating future research. The aim of this article is to provide a review of the most important results and recommendations that were reported within the project. Some of the results by masters and doctorate studies were published in national and international journals, but this is the first overall report on the project. The review of the most important research results on talent identification and its contribution to youth rugby will be divided in two phases, namely: the major research contribution during the period 1995-2000, and the major research contributions after 2000. However, it is impossible to describe a full overview of each research study, referring to aim, methodology, results, and recommendations. Therefore, only a short introduction on the aim of each study, the sample group, battery of tests, together with a report on the most important results and recommendations, will be reported within this review. However, reference will be made to where the full research results could be obtained.

RESEARCH REVIEW

Major Contributions: 1995-2000

Major research contributions during the period 1995-2000 include a study that compared the characteristics of 10-year old talented (n=45), and less talented (n=173) rugby players with each other (Pienaar *et al*., 1998). A total of 35 tests were used, comprising of 6 rugby skills tests, 8 physical and motor ability tests, and 21 anthropometric tests. By using discriminative analysis, a group of potential talented players were identified and put on a three year development programme. After completion of this programme, 85% of these players were selected to represent the North-West Province Craven Week Primary Schools Team. The results proofed, firstly that a scientific battery of tests can be used to identify potential talented 10-year old players, and secondly after a three year development programme they still preformed, as reflected by their provincial colours.

This study was proceeded by monitoring the elite group (n=32) for a further four years. Hare (1999) reported that the initially talented group (10-year olds), were still the most successful players according to the anthropometric characteristics, physical and motor abilities, and game specific skills, even after seven years. De la Port (2005) and Spamer and De la Port (2006), in a study on under sixteen and under eighteen elite players, referred to the study of Hare (1999) by stating that the assumption can thus be made that the standardized talent identification battery used by Hare, is scientifically based and successfully used.

A further investigation on this talented group was done by Pretorius (1997), who developed a prediction function that can be used to identify potential talented players according to player positions. Van der Merwe (1997), in his study among 12-year old black players (n=65), compared potential rugby talent of previous disadvantaged groups with talented 12-year old white rugby players. The results clearly showed that there were no significant differences, as far as anthropometric and physical / motor variables are concerned, among the two groups. However, in the rugby game specific tests, the white boys outperformed their black counterparts. The reason for this, according to Van der Merwe (1997), is that rugby was a strange game to black players, and they did not have the opportunity to develop rugby skills.

The research during the period 1995-2000 mainly concentrated on the anthropometrical, physical / motor, and game specific variables of talented and less talented players. According to the results of tests on hundreds of players, age 10-18, different battery of tests was developed together with norm scales that can be used by coaches to identify potential talented players (Spamer, 1999; Spamer & Coetzee, 2002).

Major Contributions: 2001-2007

When watching sport nowadays, the question invariably arises whether achievements and outstanding performance are the results of superior coaching, access to first class facilities, initial participation at a youthful age, or a combination of all these elements. Starke (2000) is of opinion that three factors: the role that nature plays (inheritance), early maturation within the organizational structure of the sport, and the role that development plays, determines whether a youth sportsperson or athlete has the ability for outstanding performance. Howe *et al*. (1998) suggested that differences in early experiences, preferences, opportunities, habits, training, and practice, are the real determinants of excellence. Another variable for high performance at youth level, not researched in rugby before, was to investigate if there is a huge difference between rugby players of the Southern and Northern Hemispheres. To help answer this question, this research project started to look at the profile of elite England and New Zealand youth players in the beginning of 2000.

In a study conducted in England, two groups of 12 year old players (an elite competitive playing group (n=33), and a socially playing group (n=50)) from two top sport schools in the country of Devon in the South West of England were identified and participated in the study. The players were tested according to the protocols described previously by Hare (1999). The comparison of the data between England and South Africa indicated that the English boys in this study possessed a greater level of subcutaneous fat; a finding which is probably best explained by differences in lifestyle and socio-economic factors between the two countries. Their fat level may also explain the poorer performance by the English boys in the physical and motor tests. The South African group furthermore showed a better performance with regard to rugby skills (Spamer & Winsley, 2003a).

A comparative study was also conducted on under eighteen level, comparing an elite English group of a Sport College at Ivybridge, England (n=25), with the Northern Bulls Craven Week Team (n=22). The results indicated that the South African group in this study was more skilful in the tests for passing distance and kicking distance. Both groups were equally matched in aspects such as stepping dexterity and passing accuracy. The South African players were also faster, and had greater arm and leg strength. These differences in motor and

physical abilities may be explained by the fact that the South African group were significantly leaner than the English players, yet the difference in game specific skills proficiency can not easily be explained by differences in body fat. Differences in passing and kicking distances are more logically attributed to differences in coaching aptitude, practice and or style of game play between the countries, but these variables were not objectively measured (Spamer & Winsley, 2003b; Plotz, 2004).

In a comparative study between South African and New Zealand under 16 elite rugby groups, the results of two South African studies (Hare, 1997; Van Gent, 2003), were compared with a elite New Zealand group (Du Plessis, 2006). Hare (1997) investigated 43 top high school rugby players in the North-West Province, and Van Gent (2003) studied 21 elite players who represented the North-West Province in the Craven Week. The New Zealand group was represented by the Taranaki Province under 16 rugby team (n=24). The results indicated that within the anthropometric tests, the New Zealand group were on average heavier than the South African group, skin fold and girth measurements showed to be larger, and body length was taller, than the South African group. This explains the large weight differences between the New Zealand and South African groups. When a comparison was made on the physical and motor ability tests, the New Zealand group was quicker in the sprint tests. In the game specific skills tests, the New Zealand group scored better in kicking for distance, passing for distance, and kick-off for distance. In summary, at an early age (16 years old) the New Zealanders are already physically heavier and stronger than the South African players. This difference in strength may be related to the life-style and culture the New Zealanders follow. From a young age, the New Zealanders are active and follow physical education programmes in the schools, while in South Africa a study done by Coetzee, Coetzee and Botha (2005) on sport participation among adolescent athletes, found that South African children are less active and competitive at a young age.

De la Port (2005) conducted a very significant study on the physical and game skills profiles of the elite South African schoolboy rugby player. The research group consisted of under 16 (n=93) and under 18 (n=97) elite South African rugby players, also known as the Green Squad of SARU. The Green Squad consisted of all population groups, and was represented by all 14 provinces in South Africa. The purpose of the Green Squad is to identify talented players with the potential to excel in senior rugby and provide them with the assistance they require to succeed (SARFU, 2003a-b).

Results of the under 16 elite Green Squad players showed that they possessed better game-specific skills in most of the tests than, the average Provincial players. This may be due to more rugby experience, the training programmes that were followed, and being more talented than the Provincial players (Van Gent, 2003; Spamer & De la Port, 2006). The under 18 Green Squad players scored faster times in ground skills than the under 18 provincial players in Van Gent's (2003) study, the Northern Bulls, and the English under 18 players in Spamer and Winsley's (2003) study, as well as the under 18 Blue Bulls, Leopards, and Ivybridge players in the study of Plotz (2004). A definite problem that was identified among the under 18 Green Squad players, was passing for accuracy. They were outperformed by most of the other international and provincial research groups.

The South African under 19 group that represented South Africa at the World Championship in 2006, were members of the same group that was tested at the end of 2004. South Africa

ended up eight in the tournament comparing with champions the previous year. If one considers the different results of the battery of tests, the poor performance of 2006 could be expected.

Another factor that could influence the performance of elite rugby players is the effect of biomechanical and postural variables. Hattingh (2003), in a study that was seen as the first of its kind in South Africa, tested several 15 year old (n=27) and 18 year old (n=84) elite school boy rugby players on anthropometric, physical and motor, and biomechanical variables. According to the latter, the 15-year old elite rugby players could positionally be classified as asymmetrical and lacking in care stability, especially in the pelvic girdle and shoulder regions. Furthermore, dynamically unsatisfactory high values were recorded, especially in the lower limbs and spinal regions. More or less the same tendency was reported among the 18 year olds, where the pelvic girdle and shoulder region can be classified as asymmetrical and lacking in care stability. Dynamically the lower limb region can be recorded as exceptionally poor in dynamic mobility. Hattingh (2003), reported that these shortcomings will contribute to injuries that will reduce the performance of elite players.

Erasmus and Spamer (2007), undertook a study on elite under 19 rugby players (n=77) to determine a profile regarding biomechanical and postural evaluations. Erasmus and Spamer reported that the lower limbs were overall dynamically loaded, but with relatively good postural alignment, and the foot and ankle region tented to have a slight deviation from the normal. All the pelvic girdle region tests correlated well with those reported by Hattingh (2003), showing some discrepancy, and can therefore be rendered as asymmetric and reasonably unstable, with a lack in care stability. The neurodynamic tests showed an overall full ROM with no tension; in contrast with Hattingh (2003) who found high values here, indicating a lack of dynamic mobility. From the research from Hattingh (2003), Erasmus (2006), and Erasmus and Spamer (2007), it becomes clear that biomechanical and postural deficiencies must be identified at an early stage, and that prevention and rehabilitation programmes must be followed to prevent injuries among elite youth rugby players.

Serfontein (2006) investigated the influences of proprioception, balance, and plyometric strength on the occurrence of lower leg injuries in schoolboy rugby players (n=24) for the age groups under 14, 15, 16 and 18. He concluded his research by reporting that balance had a small effect on the occurrence of lower leg injuries. Proprioception did not show to have an effect, while a unilateral plyometric test showed to have a medium effect on the occurrence of lower leg injuries. As no literature was available to these effects on elite rugby players, this study can be seen as the first in the field of rugby.

Another study on elite rugby players was conducted in the field of sport psychology (Spamer, 2005). The aim of this study was to investigate the ethical behaviour and values of elite rugby players on certain aspects of fair play versus winning. This study was based on a similar study that was done by Rees (2000) in the USA. Eighteen elite emerging international rugby players from South Africa, average age 20.5 years, were randomly selected to take part in this study. The results indicated that the majority of the elite rugby players honour the principles of fair play, which means their ethical behaviour in sport can be praised. To perform at top level in rugby it seems that a winning philosophy is more important than a fairness one.

CONCLUSIONS AND RECOMMENDATIONS

Research results in talent identification in youth sport, especially in team sport, are limited. It was only after the development of the conceptual model for talent identification by Salmela and Régnier (1983) that researchers concentrated on team sport. Also a lack of research was found among youth talented sportspeople, especially in rugby. When rugby became professional in 1995, it became important to introduce a scientific approach to the identification and development of elite youth rugby players. Also important was to identify potential talented players from the previously disadvantaged groups, so that they may be introduced to the game of rugby on talent and merit. With this background, a research project on talent identification and development in youth rugby started in 1994. The major results on the project were reported in the previous paragraphs. Please note that more research results are available, and that only some of the most important results were reported in this review.

After 12 years of research the following main conclusions can be made:

- the research conducted during the past twelve years on talent identification used the conceptual research model of Salmela and Régnier (1983) as scientific base. The model emphasis two main components in the identification of talent via. generic variables like anthropometric, physical / motor, biomechanics, etc., and secondly gene specific variables that plays a role in high performance in a specific sport.
- the testing of hundreds of top elite youth rugby players of different ages, resulted in the setting of norm scales and battery of tests that can be used to identify potential talent (Pienaar *et al*., 2000; Hanekom, 2000; Spamer, 2000; Van Gent, 2003; Plotz, 2004; Spamer & De la Port, 2006; Du Plessis, 2006). However, as suggested by Du Randt (1993) and Williams and Reilly (2000), norm scales are only applicable for three years due to improvement in performance.
- the research results of youth rugby players clearly indicate that maturation plays a role at a young age. Each adolescent develops his own rate of growth. Early maturers tend to be taller and stronger, and therefore better athletes (Preissers, 2000). Early maturers also seem to have more confidence, pride, and a shiny ego, compared to late maturers who seem irresponsible, childish, and seeks attention (Gouws *et al*., 2000).
- international co-operation on this research field enabled researchers of different countries to work together in an attempt to identify the profile and characteristics of elite youth rugby players (Spamer & Winsley, 2003a).
- despite more than twelve years research on the project, still little is known about a number of variables that could play a role in talent identification, including psychological aspects, diet, role of coaches and parents, and the ability to take the correct decisions during matches.

RECOMMENDATIONS

There are still many unanswered questions about the accuracy of talent identification at a young age, within the field of talent identification research. The only way to get answers to these questions is by means of longitudinal and quasi-longitudinal studies. By using this method, potential talented sportspeople can be identified and monitored for several years, at least until the age of 22, thus providing a good indication of the initially talented person's

performance. If a specific sportsperson has reached top level in his or her sport, and was regularly monitored and tested, performance norms in different tests and age can be used for future criteria in the process of talent identification. For this process to be successfully and scientifically based, we need the support of Provincial and National sport bodies. Good co-operation between these bodies, sport institutes, universities, and coaching teams are essential. With reference to rugby, nearly all provincial bodies have a development section, which could be used to facilitate the process of talent identification and development.

Except for longitudinal studies in talent identification, the following recommendations can also be made according to the research that was done over the past 12 years in this research project:

- although this project also looked into talent identification in sports like soccer, field hockey, and netball, more research is needed in these and other sports (Badenhorst, 1998; Nieuwenhuis, 1999; Karstens, 2002).
- A good database, referring to anthropometric, physical, motor, and biomechanical tests, is available and has been documented. Although a number of game specific tests in rugby were developed, we definitely need more game specific tests to be developed. Further research must also concentrate on supplement aspects of talent identification, for example psychological aspects, nutrition, decision making, and the role of parents and coaches. A new development in talent identification is the effect of date of birth (Helsen *et al*., 2000; Plotz, 2004; Serovic, 2005). However, more research is needed on this topic.

In summary, the aim of this research review on talent identification and development in youth rugby players, was firstly to get scientific evidence of the profile of an elite youth rugby player, secondly to provide coaches, selectors, and scouts proof of evidence on which variables are important in selection of elite players, and thirdly to provide a short review of the most important research results of the project for future researchers.

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(Subject editor: Prof. P.E. Krüger)