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Review

LA DETECCIÓN Y EL DESARROLLO DEL TALENTO EN EL FÚTBOL: UNA REVISIÓN

TALENT DETECTION AND DEVELOPMENT IN SOCCER: A REVIEW

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RESUMEN

La detección y el desarrollo del talento en el fútbol se han convertido en un tema de mucha importancia para la mayoría de clubes del mundo. El presente artículo trata de revisar en profundidad todos los datos publicados en el periodo 1985-2012 en relación a estos dos aspectos para lograr alcanzar un mejor entendimiento de todo el proceso de detección y desarrollo del talento en el deporte. Se procedió a realizar una profunda búsqueda en las bases de datos científicas más importantes (Ebsco, Medline/Pubmed, SportDiscus, Psychinfo, Teseo, InformaWorld, IngentaConnet, Ulrichs, Metapress, ScienceDirect, Doaj, Sage, Google Scholar, and Taylor & Francis) para identificar estudios relevantes en inglés y español sobre la temática planteada. Los investigadores parecen coincidir en que existen factores de índole físico, fisiológico, psicológico, cognitivo y social que están interconectados. Más aún, el tiempo de práctica también parece tener un papel relevante. A pesar de la tendencia tradicional de seleccionar a los jóvenes jugadores de fútbol en base a sus capacidades físicas y su nivel de maduración, hay cada vez un mayor número de evidencias científicas que señalan que esta selección debería estar basada en varios factores, como los señalados anteriormente, y otros que incluyen las habilidades perceptivas y tácticas, e incluso la genética.

Palabras clave: deporte, superdotado, élite, atleta.

ABSTRACT

Soccer talent detection and development has become an extremely important issue for most clubs all over the world. The present article tries to review all published data in the period 1985-2012 related to these issues in order to gain a better understanding of the whole process of talent detection and development in soccer. A comprehensive search of computer databases (Ebsco, Medline/Pubmed, SportDiscus, Psychinfo, Teseo, InformaWorld, IngentaConnet, Ulrichs, Metapress, ScienceDirect, Doaj, Sage, Google Scholar, and Taylor & Francis) was conducted to identify relevant studies in English and Spanish on talent detection in soccer. Researchers seem to agree that physical, physiological, psychological, cognitive, and sociological factors are interconnected. Moreover, the amount of practice also plays an important role. Despite the traditional trend of selecting young players based on physical attributes and maturation, there is growing evidence that they should be selected based on several factors, like the ones previously mentioned, and others that include perceptual and tactical skills and abilities, and even genetics.

Keywords: sport, gifted, elite, athlete.



INTRODUCTION

Soccer is probably the world's leading sport in terms of practitioners, licenses, spectators, financial resources, revenues, and impact in today's society. Moreover, it has become a very attractive profession for many youngsters all over the world. For many families, it truly represents the solution to a bunch of budgetary problems. As reflected by Bourke (2003), few professions, open to working-class people, possess such status. In spite of the high rate of failure that surrounds the journey, many young players all over the world leave their homes to pursue a professional career in soccer. Unfortunately, for every player that earns millions of Euros, there are hundreds who merely make a living out of soccer, and hundreds more that drop out at an early age for different reasons (injuries, lack of opportunities, burnout,...). Obviously, there is no guarantee of success, but the list of youngsters that attempt to reach professional soccer every year never decreases (Richardson et al., 2012).

All over the world, the best teams pay enormous amounts of money to top-level players in order to have them in their rosters. The flow of players from one team to another has forced all of them to detect and nurture talented young players that could replace the lost ones to maintain each club's performance level (Elferink-Gemser et al., 2012). At the same time, soccer clubs also try to retain those young players on a long-term basis, before they can trade them to make money. Therefore, talent detection and development has become a true necessity in today's soccer, but also a big business for everybody involved in this sport (owners, coaches, agents, parents, players, sponsors,...).

It is a fact that the sport of soccer has become a high commercialized activity in which teams have to invest large amounts of money to maintain or improve success (Bourke, 2003). Unfortunately for many players, success in soccer for most teams is just a matter of championships obtained. Therefore, they seek players capable of performing at a very high level. Understanding the process of elite development is a key element in order to attain positive results in any sport arena. Although some politicians believe that the goal is to invest strategically in elite sport (De Bosscher et al., 2009), the solution seems not to be so simple. On the contrary, it relies on several factors of a complex structure that can contribute or

inhibit elite development (Sotiriadou and Shilbury, 2009). Moreover, researchers agree that there is not a single type of factors leading to success, nor there is a model that could fit all countries or be applied to all sports (De Bosscher et al., 2006). The issue is that top soccer teams seek talented individuals in order to develop elite players. Consequently, there is a permanent need to identify and nurture future elite performers to obtain results in high-level soccer. In the search for an answer, Vaeyens et al. (2008) proposed a model for talent nurturing in soccer that includes 5 stages: detection, identification, development, confirmation, and selection.

Nevertheless, there is still a major problem. What is really talent? How can it be spotted in an 8-year old player? There has been a shift from the unitary perspective to the multi-dimensional model of talent. The traditional view of talent has been linked to the idea of ability or intelligence as genetically inherited and measurable through specific tests (Eyre, 1997). This approach did not consider motor ability as one of its components. Therefore, it was difficult to apply to sport activities. Contemporary views of talent are domain-specific, so they present multiple areas of ability. They include sport-related domains such as the Bodily-Kinesthetic Intelligence (Gardner, 1983), the Psycho-motor Skills (Perleth and Heller, 1994) or the Sensori-motor domain (Gagné, 2000). All of them can be applied to talent detection in sport.

Unfortunately, talent identification in soccer has been traditionally focused on current performance of the subjects, and according to Bailey and Morley (2006), it is a poor indicator, because it can be influenced by many different factors, such as training or parental support. Furthermore, authors such as Helsen et al. (2000) believe that talent plays a limited role in the development of elite athletes. Accumulated practice and associated factors such as coaches or facilities are necessary to become an expert in sport, and to be able to perform with success at a high level (Baker et al., 2003). Moreover, physical factors such as age or maturation also play an important role in talent detection and nurturing in soccer (Helsen et al., 2005; Naughton and Torode, 2006). Meylan et al. (2010) believe that any of these factors, when used in isolation, can produce misjudgements in talent identification. To create a global picture of talent detection in sport, Williams and Reilly (2000) identified physical, physiological, psychological, and sociological factors as influential in sport



performance of future elite athletes, but other experts identify a few more.

The goal of this investigation was to review the factors that researchers identify as important in talent detection and development in soccer. Since most of them agree that it is a multifaceted issue, all actors involved in the sport (players, coaches, parents, teams, agents,...) should be aware of them.

MATERIALS AND METHOD

The authors conducted a systematic review of the investigations that have studied soccer talent detection and development, focusing the search towards the studies carried out from 1985 to 2012. To be included in this review, the papers had to fulfil the following criteria: a) investigations published in specialized scientific journals (peer-reviewed) or in proceedings of national and international congresses, and b) research published in English and Spanish.

A literary search was carried out using the following data bases: Ebsco, Medline, SportDiscus, Psychinfo, Teseo, InformaWorld, IngentaConnet, Ulrichs, Metapress, ScienceDirect, Doaj, Sage, Google Scholar, and Taylor & Francis. Several descriptors were used in the process: soccer, talented, gifted, high ability, football, and athlete. Moreover, the reference lists of any articles pertaining to talent and soccer were scanned for further studies that were relevant to this review. To be included, the articles had to concern the development of youth football players. Unfortunately, several documents were excluded for different reasons: lack of rigour, interaction between factors, irrelevant data or inconsistency. Finally, eight topics or key areas emerged from the search: context, deliberate practice, genetics, maturation, physiological skills, psychological skills, skills and ability, and tactical skills.

Table 1.- Articles reviewed on each topic.

Topic	Number of articles
Context	10
Deliberate practice	14
Genetics	7
Maturation	16
Physiological skills	20
Psychological skills	15
Skills and ability	13
Tactical skills	9
Review articles	10
Total	114

RESULTS

A total of 114 articles were finally selected for further analysis. Table 1 shows their distribution among the different topics that emerged in the review process. Results showed that identifying a talented athlete is a very complex task, but spotting talent in young people for invasion games such as soccer is even harder.

There is general consensus on the idea that talent detection and development in soccer is a multifaceted issue (Cervera et al., 2012; Ford et al., 2011; Holt and Dunn, 2004; Ljach et al., 2012; Martindale et al., 2007; Mills et al., 2012; Unnithan et al., 2012; Vaeyens et al., 2008; Williams and Reilly, 2000). Nevertheless, different authors have stressed the importance of certain factors. Let's take a look at the different issues that have been highlighted when dealing with talent detection and nurturing in soccer (see figure 1).

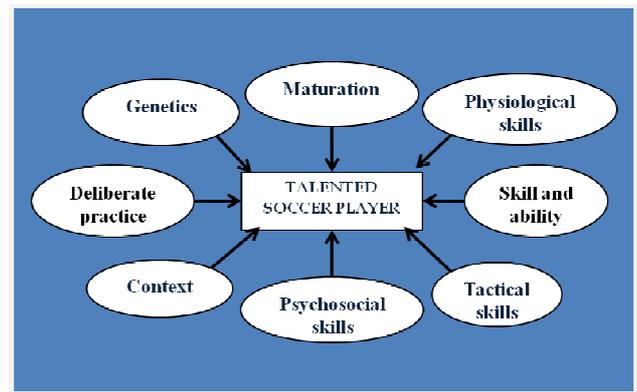


Fig. 1. Multifaceted talent detection and development in soccer

Maturation

During adolescence (13-18 years), children's bodies go through a period of dynamic physical changes (Vandendriessche et al, 2012). According to Malina et al. (2005), this process is characterized by an accelerated growth of physical size and stature that causes big changes in children's main physical parameters:

- **Height:** it is strongly linked to pubertal status. Therefore, early maturing males tend to be taller than average or late maturing males.
- **Weight:** substantial weight gain occurs during adolescence with approximately 40% of adult weight gained in males.



- **Body composition:** two attributes, muscular development and body fat deposition, account for adolescences' body composition. Both are mediated by genetics and hormone activity.

According to Pearson, Naughton and Torode (2006), physical parameters are not reliable for talent identification due to several reasons: the large variation in growth potential among individuals during and following puberty, the insignificance of the weight differences between early and late maturing adolescents during adulthood, the fact that advanced muscularity does not continue into adulthood, and the issue that body fat can be modified through behavioural factors such as physical activity and nutrition. Certainly, the identification of biological variables that can predict future sport performance is almost impossible (Gonçalves et al., 2012).

Unfortunately, many of those in charge of scouting talent among young soccer players are coaches extremely influenced by the physical attributes and the maturation stage of the children (Vandendriessche et al, 2012), making the selection process highly subjective (Williams and Reilly, 2000). In fact, a difference of several months during the teenage years can produce significant differences among children in their physical, cognitive, and emotional characteristics (Helsen et al., 2000; Pérez and Pain, 2008). This way, many potentially talented players are disregarded just because they were born late in the selection year, and they are thus less developed. This trend has been called the "relative age effect" (Vaeyens et al., 2005), and prevents many youngsters from receiving opportunities to cultivate their talent, and reach their highest level in soccer. Associated to the relative age effect, Helsen et al. (2005) have described, on those same children born in the early part of the year, the "initial performance advantage". It can be defined as the perceived competence that leads these children to a higher degree of motivation in competition and to a perception of increased competence for sport. Both characteristics give those soccer players a definite physical edge over their teammates, making them appear more talented to the coaches that have to select the best individuals. Unfortunately, recent research has showed that the relative age effect continues to bear a strong impact on talent detection and identification in soccer (Helsen et al., 2012).

Physiological skills

Many sport talent programs rely solely on the assessment of physiological parameters such as strength, aerobic capacity or anaerobic power to identify the best players:

- **Aerobic capacity:** its absolute VO_2 peak values increase through adolescence, but stable scores when expressed per kilogram of body mass. Nevertheless, improvement occurs in field-based endurance tests (Bets and Pitetti, 2004). The aerobic trainability of adolescents depends on the initial fitness of participants, their training history, compliance with the training program, and the quality and duration of the intervention.
- **Anaerobic power:** the marked trainability of muscle power, the relationship between body-size and anaerobic power, and the non-linear improvement during adolescence make extrapolations of results from young athletes to adult athletic performance, at least, problematic. Therefore, the training outcomes appear to be very specific and transient.
- **Strength:** it is related to factors such as hormones (serum testosterone) and body size, and it is largely modifiable through well-implemented training interventions. Therefore, results from adolescent strength testing are problematic predictors of adult athletic performance. Safety remains the major issue in strength training.

Pearson et al. (2006) believe that traditional physiological assessment procedures are frequently used despite their low predictability and limited specificity. Furthermore, Naughton et al. (2000) consider that adult performance is very difficult to predict from values obtained during adolescence, since subjects' growth and trainability are very different among individuals. Consequently, most researchers agree that it is imprecise to use this type of information for talent selection and development in complex sports such as soccer. However, a recent research work has showed that soccer-specific speed and upper-limbs power tests can discriminate future playing status among adolescents (Gonaus and Müller, 2012). Maybe, it is a matter of using the right assessment procedures and tests.

Nevertheless, Williams and Reilly (2000) consider that the evaluation of physical and physiological parameters in young players can create an interesting



database. These records could help coaches identify strengths and weaknesses of their young players, monitor their progress, and help them improve their individual performance. It could also help the overall talent development program through the enormous amount of age-related information that could be gathered through these tests. This knowledge could be used as a reference to monitor the progress of the young players.

Skill and ability

Williams and Reilly (2000) strongly believe that young players should be selected considering skill and ability rather than physical size. Soccer is a sport characterized by a constant interaction among offensive players, defensive players and the ball. Players are immersed in an unstable context under the additional pressure of time. They need to pick up all the information that surrounds them, and make the correct decision, with or without the ball, at the right time (Mills et al., 2012). Therefore, talented soccer players need high-level perceptual skills. Coaches refer to this issue as the ability to “read the game”. Furthermore, they use it to spot talent in soccer, but it is very speculative since they do not use any scientific method or instrument. Regarding perceptual skills, Williams (2000) have pointed out several abilities that talented soccer players possess:

- Recall Performance: the ability to recover from the memory information related to soccer more effectively.
- Advance Cue Utilization: the ability to make precise predictions based on an opponent’s posture and/or actions.
- Visual Search Strategy: the ability to move the eyes continuously to focus on the important aspects of the game.

According to Williams (2000), talent selection and development programs in soccer should focus on this type of skills. Besides, all players can improve their performance through specific instruction and practice based on these skills, regardless of their initial ability (Williams and Grant, 1999). There are several techniques that coaches could use to help young soccer players improve their perceptual skills:

- Guided Discovery: players are led by experts (coaches or players) to find out the important elements of the sport.

- Qualitative Match Analysis: players and coaches watch soccer games focusing on several aspects of the competition: errors or mistakes, positive actions, things to improve...
- Video Simulation: players are faced with different soccer settings, and they have to decide the right action to perform.

According to Haugaasen and Jordet (2012), soccer-specific play is more important than non-specific play for talent development. Therefore, coaches should provide specific soccer experiences for their players to improve their specific skills and abilities.

However, there is an ongoing, inconclusive debate about what is better to lead soccer players to reach the highest level in soccer performance: early specialization or diversification (Cervera et al., 2012). Moreover, a third via in this process has been proposed. It is called early engagement (Ford and Williams, 2012) and it involves more time in soccer specific practice and play activity in childhood, followed by an augmented soccer-specific practice and competition during early adolescence.

Tactical skills

On the other hand, these perceptual abilities are closely related to the “tactical” skills needed during game performance. Kannekens et al. (2009:807) define them as: “the ability of an individual player to perform the right action at the right moment, and quickly adapt to new configurations of play and the circulation of the ball”. As stated earlier, soccer’s environment changes constantly due to the interaction of both teams with the ball, and players must learn how to adjust its performance to meet the context’s specific needs. Tactical skills have been linked to several cognitive competencies, and they have been categorized into:

- Declarative knowledge: knowing the rules and goals of the game (Williams and Davids, 1995).
- Procedural knowledge: knowing what to do at the right time (McPherson, 1994).

Tactical skills are a key element in soccer. Every technical action has its constraints, and the player must decide how to execute that specific action to achieve his goal. According to Kannekens et al. (2009), high-skilled soccer players outperform their less skilled teammates on several aspects of



declarative and procedural knowledge. In a recent study, Kannekens et al. (2011) found that “positioning and deciding” were the tactical skills that best predict adult performance. Therefore, these tactical skills must be considered when selecting and developing talented soccer players.

Psychosocial skills

Researchers such as Holt and Dunn (2004) or Van Yperen (2009) believe that psychosocial competencies must also be considered when trying to detect and develop talented soccer players. They have identified four major psychosocial competencies associated with soccer success during adolescence:

- Discipline: the ability to display appropriate discipline and dedicated behaviors (conforming dedication, willingness to sacrifice...).
- Commitment: the motivational forces (love of the game, determination to succeed, social status...) and goals (playing up, gaining exposure...) of the young players.
- Resilience: the ability to bounce back after adversity (personal and contextual obstacles).
- Social support seeking: the ability to perceive and use available sources of social support (parents, coaches, friends, teammates...).
- Problem-focused coping behaviours: thoughts and behaviors used to manage internal and external demands of situations that are perceived as stressful.

On the other hand, self-regulation is the degree to which individuals are metacognitively, motivationally and behaviorally proactive participants in their learning process (Zimmerman, 2006). It involves processes that enable individuals to control their thoughts, feelings, and actions (Baumeister and Vohs, 2004). Toering et al., (2009) examined its relationship with performance level in youth soccer players, and found that two elements positively predict success:

- Reflection: it translates knowledge into action from specific activities through thought processes.
- Effort: the ability to sustain commitment to invest large amounts of time into training.

In a recent research work with expert coaches in talent detection and nurturing in soccer, Mills et al.,

(2012) found a few more psychosocial skills needed for soccer players to improve their performance:

- Awareness: the ability to perceive what is happening with me and the others.
- Goal-directed attributes: personal characteristics such as passion, professional attitude...
- Sport-specific attribute: personal traits such as coachability, competitiveness...
- Environmental factors: elements of the context such as significant others (friends, family, teammates...), culture of the game....

Context

Talent development does not rely exclusively on the young players that are going to be nurtured. The context where talent expects to be developed is extremely important too. Martindale et al. (2007) have included several points for environments to be considered effective in talent development:

- Long-term aims and methods: everybody involved should not plan for short-term results via stressful processes for the youngsters.
- Wide range of work: it is fundamental to develop the whole player: physically, psychologically, and socially.
- Coherent messages by coaches and parents: it is very important that anybody that can influence the young players transmit similar messages to them. Role-models are very important at this age, and they need to send the right message.
- Constant support to the young players: adolescence is a very unstable phase. Players will constantly go through ups and downs, so they need the support of everybody that surrounds them.
- Emphasis on appropriate development: the context must provide stage-specific experiences through adequate methods that could help the player develop autonomy, responsibility, intrinsic motivation, and personal commitment.
- Individualized working methods: development within and between individuals is personal and unpredictable. Therefore, players need flexible working methods that can be adjusted to meet their needs.
- Ongoing: a systematic process of goal setting, developing, and reviewing is absolutely necessary to monitor and be able to help the irregular process of talent nurture.



These authors consider that talent development must be integrated, holistic and systematic to be effective and successful. Moreover, Ljach et al. (2012) believe that the existing soccer training programs should be revised to incorporate multidimensional, pedagogical methods that include sensory, motor, and cognitive abilities.

Deliberate practice

Traditionally, there has been a debate between the magnitude of nature and nurture in the development of high-level athletes. Several authors, such as Helsen et al. (2000), have described the strong relationship between practice and the development of expertise in sport. Within this idea, Ericsson et al. (1993) proposed a model for talent development based on what they called “deliberate practice”: any activity specifically designed to improve the current performance of athletes. This type of task holds two fundamental characteristics:

- It is effortful.
- It is not intrinsically pleasant.

As stated in the introduction section, Ericsson et al. (1993) consider that the “10 year rule” is the pivotal point to nurture athletes. They believe that any athlete needs 10 years or 10.000 hours of deliberate practice to become elite. Therefore, accumulated practice is absolutely necessary to acquire the skills and the experience required to become an expert player. Furthermore, Helsen et al. (2000) have reviewed all significant research done on deliberate practice in soccer, and believe that practice is a major facet in the development of soccer proficiency. Certainly, recent research has linked the number of hours of soccer-specific play activity during adolescence and perceptual-cognitive expertise in young talented players (Roca, Williams and Ford, 2012).

Probably, no one undermines the idea that practice is extremely important for the development of high-level soccer players, but many believe that talent (nature) is also fundamental. Mönks and Mason (2000) consider that it is more a matter of what kind of interaction takes places between both elements, and how this connection impacts individual development.

Genetics

Over the last decade, there has been a growing interest on the genetic aspect of elite performance. Furthermore, a specific gene has been linked to athletic performance. According to Coghlan (1998), the ACTN-3 has two variants: one for endurance and another for speed. Athletes who possess one or the other version may excel in one or the other type of events. However, the use of this knowledge for talent detection in soccer is, at least, limited.

Manning et al. (2003) also reported a correlation between the ratio of the 2nd and 4th digit length and the ability in soccer. They found that this ratio can be translated into fetal androgen concentration which, in turns, correlates with speed, soccer ability and viso-spatial perception. To our knowledge, this tool has not been used for talent detection in soccer.

As described by Reilly et al. (2000) the amount of genetic influence on sport talent is difficult to quantify. Moreover, there is a lot of confusion on personal genetic testing for sports performance. A few studies have been conducted trying to predict a subject's potential for power or endurance sports, to identify a genetic predisposition for increased exercise endurance, muscular power, and/or injury risk for muscle damage. Furthermore, there has been an attempt to design a method for formulating an exercise program for improving physical performance based on genetic testing (Grimaldi, Paoli and Smith, 2012). Nevertheless, none of these studies have been conducted for talent detection and/or development in soccer.

The genetic debate brings back the old dichotomy nature/nurture in sport, but most researchers agree that there is a need for both on soccer development. Moreover, Miah and Rich (2006) warn us that genetic testing for talent selection may narrow our understanding of the complex ways in which ability materializes in sport settings. This is especially true in a complex sports such as soccer where environmental factors and personal intrinsic factors are determinants of success.

CONCLUSIONS

There is general consensus on the idea that talent detection and development in soccer is a multi-faceted issue. Therefore, it should be approached from a holistic point of view. Physical (maturation and relative age effect), physiological (aerobic capacity, anaerobic power, strength, soccer-specific



speed and upper-limbs power), psychosocial (discipline, commitment, resilience, social support seeking, awareness, problem-focused coping behaviours, reflection, and effort), perceptual (recall performance, advanced cue utilization and visual search), technical (soccer-specific play) and tactical elements (declarative knowledge, procedural knowledge, positioning and deciding) have been identified as influential on talent programs. The amount of practice (10 years-10.000 hours) and the context where the teaching/coaching-learning process takes place (long-term aims and methods, wide range of work, coherent messages by coaches and parents, constant support, emphasis on appropriate development and individualized working methods) have also been pointed as important features in the process. Finally, pedagogical techniques (guided discovery, qualitative match analysis and video simulation) have mentioned as key elements to build strong training programs, too.

Unfortunately, there are so many young children interested in playing soccer that talent detection programs “can afford losing” some talented children based on premature, short-term testing. However, talent selection is not only an issue of making or not making the team at a certain stage and/or age. It is a more complex phenomenon that needs a multidisciplinary approach.

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