A first step to an evidence-based talent identification program in the Netherlands; a research proposal

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Abstract: Talent identifications programs are developed for several sports in different countries around the world to improve the chance to excel during important sports events like the Olympics or World Championships. Not only elite sports at world class level but also the recreational level will benefit from talent identification programs. For a small country as The Netherlands, it is desirable to develop a good talent identification program to keep up with international level and to improve the connection between table tennis and recreational sports or non-athletes looking for a sport that fits them well. Because the key-factors which determine talent for table tennis are unknown, research to get a scientific fundament for a talent identification system for table tennis sports is desirable. This article presents a long-term research project (PhD) which is set-up by the Dutch Table Tennis Federation (NTTB) together with Saxion University of Applied Sciences and IQ Healthcare of the Radboud University Nijmegen in The Netherlands. The main purpose of this project is to find sport-specific determinants which play a key-role in talent identification in table tennis using a combination of top-down and bottom-up approaches.
Preliminary results from the top-down approach are already available from reliability and validity studies on the talent identification assessment (TIDA) which is used by the NTTB. Analysis shows mainly good reliability for the test items separately and for the TIDA as a whole. Concurrent validity is partly confirmed for the TIDA, however further analyses are necessary. This research project can make an important step to an evidence-based talent identification program which benefits table tennis and other sports at elite and recreational level.

Keywords: Table tennis, talent identification, evidence based

1. INTRODUCTION

Talent identification programs are used to identify talented athletes in time and to succeed at world class level. Besides the benefits for elite sports, talent identification in sports can be a helpful tool to increase sport participation in an open population and to reduce drop-outs by providing an optimal connection between sports, talents and personal preferences also on an amateur level.[9,14]

In literature suggestions are made about the determinant factors in sports which can predict success and should be used for talent identification. Models propose factors from several areas such as: 'anthropometry', 'motor skills', 'mental skills', 'physical qualities' and 'contextual factors' [1,5,9,16,17], Fig. 1.
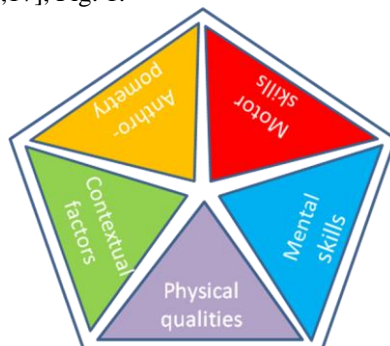

Fig. 1. Domains / Areas for talent identification

Although key-predictors are recognized for some sports [2,19-21], most sports still search for these specific determinants. Therefore, it has been recommended that each sport should develop a sport-specific talent identification program.[1,5,9,16,17]

Earlier research about table tennis revealed that trainers / coaches of the Dutch national selection found the presence of 'motor skills' the most important area to succeed, followed by mental and physical fitness [19]. Descriptions about table tennis sports from several authors proposed the following motor skills and physical traits as important for good table tennis performance: coordination, visual perception, control of arm and head movements, technical knowledge, a good sense of the game, ball control, good cardio-respiratory endurance, upper body- and hand strength in combination with good joint and muscle flexibility [7,10,11,15,18,22].

In contrast, Limoochi reported that of 40 international level coaches 36% ranked anthropometric factors as most important for talent identification followed by psychological factors (33%) and psychomotor factors (25%). From these areas 'standing height', 'intelligence' and 'motivation' were proposed to be key-factors, respectively. Only 11% of the coaches choose physical motor factors as most important.[12] Nevertheless, it must be remarked that because no specific definitions or way of measurements were given for each factor in this study, it is quite hard to make a

good interpretation and comparison with other studies.

Concerning the mental skills, Chu et al. [3] reported, using a qualitative approach, that the optimal mental states for ten elite table tennis players in Taiwan were characterized by concentration, self-confidence, positive thinking, emotional management and motivation. In addition, Lopez & Santelices [13] concluded from data (Manchester Personality Questionnaire) of elite table tennis athletes from the Philippines that personal characteristics of originality, rules consciousness, assertiveness, competitiveness, conscientiousness, achievement and resilience should be taken into account for effective recruitment of talents.

However, at this moment little scientific evidence is available about the determinants which are key-factors in table tennis and predict success on world class level. This has to be found out, before the next step 'how to measure them' can be made.

Our main research question therefore is: Which sport-specific determinants are important for identifying table tennis talent in youth players (7-12 years)? Research which combines top-down and bottom-up approaches is proposed to be an appropriate way to answer this question, Fig.2.
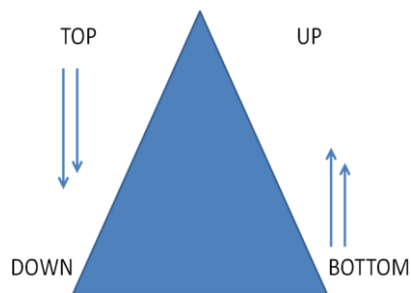

Fig. 2. Top-down and bottom-up

2. RESEARCH PROPOSAL

2.1 Top-down approach

The top-down approach is characterized by gathering empirical evidence using established methods to confirm or reject a priori hypotheses [16]. Univariate and multivariate analysis methods in retrospective data will be used to answer the research question.

The Dutch Table Tennis Federation (NTTB) developed a talent identification program to organize and structure talent identification. The national talent day is one of the events in this program. During the national talent day of the NTTB young table tennis athletes are tested for their table tennis talents. Therefore these children participate in a tournament while being observed by scouts and their motor skills are tested using a talent identification assessment (TIDA), Table 1.

Table 1: Current test items of the TIDA (Talent Identification Assessment)

Test item	Short description
Sprint	Pick-up and bring back 6 table tennis balls as fast as possible (pyramid shape sprint)
Agility	Getting through a circuit as fast as possible; over a gymnastics cabinet and under a low hurdle.
Vertical Jump	Jumping as high as possible.
Speed while dibbling	Sideward dribbling through a zigzag circuit.
Aiming at target	Aiming at a target with bat and ball.
Ball skills	Aiming at a target with different balls (football, tennis ball, table tennis ball) using one bounce.
Throwing a ball	Throwing a table tennis ball as far as possible.
Eye hand coordination	Throwing and catching a table tennis ball against a vertical table as often as possible in 30 seconds using alternatively the left and right hand.

Data were collected from 1998 till 2010 and include the test results and tournament ranking of more than 1300 youth players aged between 5-12 years. Moreover the national rankings of the youngsters were available to follow the performance level of these youth players over years. This data-set was used for the analysis of the top-down approach and mainly consisted of performance measurement of motor skills (Fig.1). Sport-specific determinants for talent could be found by comparison of the well performers and poorly performers to learn more about talent identification in table tennis.

In addition to above, the reproducibility of the TIDA was investigated analyzing internal consistency and test-retest reliability [4] and new test items were developed to cover all specific traits which were suggested for talent identification by the NTTB experts. For the newly developed items validity was investigated by comparing talented and non-talented youth players and also a test-retest design was used to study reliability.

2.2 Bottom-up approach

In the bottom-up approach elements for solution come from the collective wisdom, the rich anecdotal evidence, and the language of the sport performers themselves. Régnier et al. [16] reported this as an attempt to find out what features talented athletes cite in any specific area to explain their exceptional performance. Also the experiences of expert trainers / scouts could be of great value to find sport-specific determinants for table tennis.

Qualitative studies are now designed to gain more insight in the vision and experiences of elite players and top trainers / scout on talent identification and development. Semi-structured interviews will be held to collect data. A content analysis will show whether the TIDA covers most important motor skills and physical traits and which other determinants should be taken into account in future.

3. PRELIMINARY RESULTS

At this moment only preliminary results are available.

Reliability studies have been conducted on the used test items. As a whole the TIDA has a good reliability and also per test items mainly good reliability has been shown [4].

The analyses for validity and to find sport specific determinants are now in process and the final results are expected at the end of 2011. From the first analysis the validity of the test items 'speed while dribbling', aiming at target, ball skills and 'eye hand coordination' seem promising; the concurrent validity [6] or the ability to discriminate between talented and less-talented youth players seems to be confirmed. However, further analyses and corrections for confounders are needed to make fair conclusions.

New data for the bottom-up approach still need to be collected and analysed. This research will be carried out in 2012 and results are expected at the end of 2012.

4. DISCUSSION

A talent identification program which is based on scientific evidence can be of great value for table tennis. Of course, individual exceptions which do not fit the criteria of such a program always remain. However, elite sports and also sport at a recreational level are expected to benefit from good talent detection by decreasing the chance to miss talent.

Since Van Rossum and table tennis experts [7,10,11,15,18,22] showed that motor skills and physical fitness are important traits in table tennis, it seems reasonable to investigate the value of the TIDA used by the NTTB. Moreover, talent identification which only consists of national ranking seems inappropriate, because ranking is influenced by the amount and quality of training. Especially in a small country as the Netherlands ranking will not provide the necessary information and talents could be missed. Furthermore, the nowadays system of scouting is not transparent enough and personal preferences of scouts might influence the results. A systematic approach of testing with valid and reliable tools on sports-specific determinants during a talent identification program is desirable to objectively select talents [9].

To obtain fair results for talent identification some required conditions are proposed when using a TIDA to test motor skills and physical fitness. First of all, the test items of the TIDA should cover all traits which play a key-role in table tennis. Secondly, to avoid the influence of training on the performance outcome, the test items should consists of uncommon tasks which are more or less new for everyone, but which are correlated to table tennis competencies. Therefore, table tennis tasks as returning a service, playing forehand topspin or the specific table tennis tests that Katsikadelis [8] used seem inappropriate. Then the tasks must motivate youth players in the age between 7-12 years to perform at their bests. So the tasks should be challenging and quite fun to do. Of course all test items and the TIDA as a whole must also meet the psychometric requirements for reproducibility, validity and responsiveness. Finally, for a good interpretation it is desirable to have norm values which are age and gender corrected [9].

Although the first analyses are promising for reliability [4] and validity further research is necessary to find the complete set of sport-specific determinants for table tennis. A critical reflection about the construct of the TIDA and the predictive value of the test items are essential to make straight conclusions.

Besides motor skills and physical traits also mental aspects and maybe other personal (anthropometric) and environmental factors must be taken into account for talent identification in table tennis [3,12,13]. A good talent identification system includes sport-specific factors from different areas / domains (Fig. 1). Although some research has been conducted in the Philippines and Taiwan to identify some of the mental / personal key-factors [3,13], the question arises whether these results can be extrapolated to countries in Western Europe. This also applies to the results of Limoochi's study [12]. Cultural aspects and the norms and values of countries differ quite a lot, which can influence the results. A bottom-up approach with semi-structured interviews of elite players from the Netherlands and other Western European countries would add more insight which determinants are important for talent identification.

In conclusion, this research project aims to make a step to an evidence-based talent identification program which benefits sports at elite and recreational level. A combination of top-down and bottom-up research provide results a complete insight in the determinants which play a key-role for table tennis talents. Results from this study can be especially used for table tennis, however other racket sports also might profit, too.

REFERENCES

[1] Bosch, van den J., Cocq, de C. *Sportief talent ontdekken. Scouten, meten en testen van jonge kinderen voor diverse sportdisciplines. [= Identify sportive talent. Scouting, measuring and testing*

young athletes.] Acco, Leuven, Belgium, 2006.

[2] Bös, K., Schneider, W. *Vom Tennistalent zum Spitzenspieler; eine Reanalyse von Längschnittdaten zur Leistungsprognose im Tennis.* Czwalina Verlag, Hamburg, Germany, 1997.

[3] Chu, C.Y., Chen, I.T., Hung, T.M. Sources of psychological states related to peak performances in elite table tennis players. *[12ᵗʰ ITTF Sports Science Congress, Rotterdam, the Netherlands],* 2011.

[4] Ekman, S., Faber, I.R., Oosterveld, F.G.J., Nijhuis - Van der Sanden, M.W.G. Reliability study of a motor test battery for talent identification. *[12ᵗʰ ITTF Sports Science Congress, Rotterdam, the Netherlands],* 2011.

[5] Elferink-Gemser, M.T. *Today's talented youth field hockey players, the stars of tomorrow? A study on talent development in field hockey.* Ponsen & Looijen bv, Wageningen, the Netherlands, 2005.

[6] Faber, I.R., Oosterveld, F.G.J., Nijhuis - Van der Sanden, M.W.G. Concurrent validity of test items of a talent identification assessment. *[12ᵗʰ ITTF Sports Science Congress, Rotterdam, the Netherlands],* 2011

[7] Horsch, R. *Tischtennis; Schule, Verein, Freizeit. Sport in der Lehrerfortbildung. Band 4.* Universitätsverlag Konstanz GMBH, Germany, 1990.

[8] Katsikadelis, M., Pilianidis, T., Douda, H., Tokmakidis, S.P. Talent identification in table tennis. *The proceedings of the 9ᵗʰ ITTF Sports Science Congress,* 275-279, 2006.

[9] Kondric, M. The expert system for orientation of children into table tennis in the Republic of Slovenia. *International Journal of Table Tennis Sciences,* 3, 125-130, 1996.

[10] Kondric, M., Furjan-Mandic, G., Kondric, L., Gabaglio, A. Physical demands and testing in table tennis. *International Journal of Table Tennis Sciences,* 6, 165-170, 2010.

[11] Lees, A. Science of the major racket sports - a review. *Journal of Sports Sciences*, 21, 707-732, 2003.

[12] Limoochi, S. A survey of table tennis coaches' opinions of some criteria in talent identification. *The proceedings of the 9ᵗʰ ITTF Sports Science Congress,* 280-287, 2006.

[13] Lopez, A.V., Santelices, O.Y. Personality characteristics of elite table tennis athletes of the Philippines: a basis for a proposed recruitment program. *[12ᵗʰ ITTF Sports Science Congress, Rotterdam, the Netherlands],* 2011.

[14] NOC*NSF. *Sport groeit! - Sportagenda 2012. [= Sport grows! – Sportagenda 2012.]* Nederlands Olympisch Comité * Nederlandse Sport Federatie, The Netherlands, 2007.

[15] Raab, M., Masters, R.S.W., Maxwell, J.P. Improving the "how" and "what" decisions of elite table tennis players. *Human movement science,* 24, 326-344, 2005.

[16] Régnier, G., Salmela, J.H., Russell, S.J. *Talent detection and development in sport. A Handbook of Research on Sports Psychology* (edited by R. Singer, M. Murphey, and L.K. Tennant); 290-313. New York: Macmillan, 1993.

[17] Reilly, T., Williams, A.M., Nevill, A., Franks, A. A multidisciplinary approach to talent identification in soccer. *Journal of Sports Sciences,* 18, 695-702, 2000.

[18] Rodrigues, S.T., Vickers, J.N., Williams, A.M. Head, eye and arm coordination in table tennis. *Journal of Sports Sciences,* 20, 187-200, 2002.

[19] Rossum, van J.H.A., Gagné, F. Rankings of predictors of athletic performance by top level coaches. *European Journal for High Ability,* 5, 68-78, 1994.

[20] Rossum, van J.H.A. Psychological characteristics of elite athletes according to top level coaches. *High Ability Studies,* 7, 15-23, 1996.

[21] Rossum, van J.H.A. Wie haalt het Nederlands hockeyteam? Een talentontwikkelingsonderzoek naar voorspellen op grond van junior gegevens. [= Who gets to the Dutch national hockey team? – A research about talentidentification in junior-athletes.] *Sportgericht,* 60, 4-7, 2006.

[22] Sorensen, V., Ingvaldsen, R.P., Whiting, H.P.A. The application of coordination dynamics to the analysis of discrete movements using table tennis as a paradigm skill. *Biological cybernetics,* 85, 27-38, 2001.