How it started

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Finding and guiding talented players could contribute to the improvement of the Dutch water polo team in the future. The first step is to identify talents who have the potential to reach elite level in water polo. The second step is to develop talents the best way possible. Identifying and developing talents is not that easy and depends on several components. In various other sports such as soccer, field hockey or tennis, a general test battery to develop and identify talents is already made. A general test battery contains several tests that mimic the demands in the sport to help identify potential talent. However, such a test battery is not present yet in water polo. Therefore, the aim of this paper is to develop a test battery for practical use in male youth water polo players. The test battery can have several purposes, one of these is talent development. It is easier to find strength and weaknesses of a player when the test battery has been performed multiple times. Based on this, individual training schedules can be made to improve the development of the players. This will help to increase the level of Dutch water polo. Another purpose is to evaluate the player’s performance after injury compared to the performance before the injury. Eventually, when enough data is gathered to have an indication of good and bad test results, the test battery can be used for talent identification. Hereby, coaches can better decide which players are talented and could eventually make it to the top in water polo.

Finding and guiding talented players could contribute to the improvement of the Dutch water polo team in the future. The first step is to identify talents who have the potential to reach elite level in water polo. The second step is to develop talents the best way possible. Identifying and developing talents is not that easy and depends on several components. In various other sports such as soccer, field hockey or tennis, a general test battery to develop and identify talents is already made. A general test battery contains several tests that mimic the demands in the sport to help identify potential talent. However, such a test battery is not present yet in water polo. Therefore, the aim of this paper is to develop a test battery for practical use in male youth water polo players. The test battery can have several purposes, one of these is talent development. It is easier to find strength and weaknesses of a player when the test battery has been performed multiple times. Based on this, individual training schedules can be made to improve the development of the players. This will help to increase the level of Dutch water polo. Another purpose is to evaluate the player’s performance after injury compared to the performance before the injury. Eventually, when enough data is gathered to have an indication of good and bad test results, the test battery can be used for talent identification. Hereby, coaches can better decide which players are talented and could eventually make it to the top in water polo.

Menno de Vries, experienced water polo player and currently coach of the U17 team of Swol1894 (Dutch second youth division), is interviewed to get his opinion on this topic. Based on his expertise, the test battery is evaluated and adjusted.

Beijing 2008, the Dutch women’s water polo team won the gold medal at the Olympics. The men’s national team was sitting at home watching. The last time the Dutch men’s national water polo team even qualified for the Olympics was in 2000. This paper aims to improve the level of Dutch water polo. Can the men catch up with the women?

The current situation in water polo talent identification according to Menno de Vries: “I have been taught to always look at the skills that cannot be trained very well. Especially technical and tactical skills such as ball skills and an in-game tactical view. Additionally, motivation is very important and plays a big role in selecting my starting squad for example.”
This test battery is developed based on the Groningen Sport Talent model (Fig. 1). This model states that to increase sport performance, task characteristics, environment and performance characteristics are important and that these components interact with each other. For this test battery, the focus lies on the performance characteristics, since these are individual characteristics. The model divides the performance characteristics into five components: anthropometric, physiological, technical, tactical, and psychological. The test battery for water polo will consist of these five components.

The first component is anthropometric. The body height, body weight, sitting height, arm span, and hand span will be measured. These anthropometrics are position-specific. A starting water polo squad consists of one center, one point, two wingers, two drivers, and one goalkeeper. Centers, points, and goalkeepers are the tallest because they have to reach further to intercept balls. Centers are also known as the players with the largest body mass and BMI because they have frequent physical contact with opponents to keep a good position in the field. Goalkeepers are slightly dominant in arm span, but have a lower BMI compared to other positions. The wingers and the drivers are the shortest and fastest players. Sitting height is important for all positions. A shorter sitting height means relatively longer legs. Longer legs are beneficial for the eggbeater kick, which is used a lot in a water polo match for keeping position and maintaining the upper body outside of the water.

The second component is physiological. Water polo consists of high-intensity bursts of sprinting, interspersed with short periods of low to moderate-intensity swimming. There is a great demand on anaerobic alactic system, high demand on aerobic system and moderate demand on anaerobic lactic system (7). The mean heart rate (HR) of elite male players during a game is approximately 83% of HRmax (4). Elite water polo players present a high level of aerobic power and endurance indicated by their maximal oxygen uptake and speed at the lactate threshold. Therefore, a high conditioning level is essential in water polo. Important is thus, maximizing aerobic endurance and high-intensity intervals. Three different aspects of the physiological performance of youth athletes will be measured: Strength & Power, anaerobic capacity, and aerobic capacity. Strength & Power will be measured with the vertical in-water jump and the 1 RM bench press. The anaerobic capacity will be measured with the water polo intermittent shuttle test (WIST). Aerobic capacity will be measured with the shuttle swim test.
Thirdly, the technical component is measured. In this part shooting accuracy, throwing velocity and 12.5 meters sprint are measured. Shooting accuracy is measured with a canvas in front of the goal, this canvas has holes where the player has to throw the ball through. The holes are in the corners of the goal and above the head of the goalkeeper, since these places have the most chance of scoring (5). The test contains of 20 shots in total with 4 trials at each hole. Throwing velocity is measured with a radar gun. This gun is stationed behind the goal and points towards the ball. The player has to throw the ball toward the goal, the radar gun then shows the velocity of the ball. Throwing velocity in the overhead movement is considered to be a crucial factor in water-polo. The faster the ball is thrown, the less time the goalkeeper has to stop it. Ball speed is primarily dependent on the backswing phase of an overarm throw and the ability to maintain a greater part of their body out of the water (6). 12.5 meters sprint is measured by starting in the water, 2 meters from the side of the pool. Time is measured with a stopwatch and is noted for each player.

Menno de Vries: “I like to train match like situations. 12.5 meters sprint without push-off is performed a lot in the match and in this way, you will catch the most aspects of swimming technique in water polo.”

The fourth component is tactical. One of the relevant tactical components is decision making. Decision making is defined as the process of selecting the appropriate movement response from a range of possibilities. The ability to make fast and accurate decisions is considered essential in water polo (5). Decision making will be measured by the interpretation of in-game situations. 20 different situations will be pre-recorded and judged by a number of professional coaches/trainers. Based on their opinion, a minimum of “0” and a maximum of “2”, will be given to certain decisions. This score will represent the tactical skills of a player. Next to the in-game situation interpretation, questionnaires will also be filled out on tactical skills.

The last component are the psychological demands. There is little research on psychological skills in water polo. However, psychological skills are very important to reach the top. From other sports it is known that being motivated, being self-confident, able to cope with problems and make the right decisions at the right times, are important factors of psychological skills (8). A couple of questionnaires can be used to evaluate these characteristics, examples are: Sport Motivation Scale (SMS) and the Athletic coping skills inventory (ACSI).

The test battery is made for water polo players of all levels in the youth categories of <15, <17 and <19 (13 to 18 years old). All tests can be guided by the coach, physiotherapist or human movement scientist. The tests are spread over three days (table 1). This is done because some tests are quite intense. Doing several of those tests on the same day, will influence the results. The players can be fatigued or they lose motivation to complete the test. The tests are divided over the days based on the demands on different parts of the body. For example, if the shooting tests are done on the same day as the shuttle test, this could interfere and test results will not be optimal. The psychological questionnaires will be filled out at the beginning of the day when the
players are still fresh and not influenced by the other tests. There will be an excel-sheet where the coach can fill in all the test results. When all results are filled in figures of the results will be shown. The data analysis needs to be done by a human movement scientist. The end product will be handed over to the coach. The only thing the coach has to decide is which players he wants to have for his selection. The product the coach will receive is shown in figure 2. For every player, the coach receives such a figure. In these figures, the mean score of all players is shown by the red line. Based on the coach purpose for using the test battery the mean score can be of a selection, team or past scores of a player. The orange line is the individual score. When this line is outside the red line, the player is performing better than the other players. When the orange line is inside the red line, the player is performing worse than the other players. This figure is made for the 5 subdomains (figure 1a), anthropometrics, the physiological characteristics (figure 1b) and the psychological characteristics. For the technical and tactical characteristics a table will be made. This table shows if the player belongs to the worse 25%, between 25-50%, between 50-75% or to the best 25% (75-100%) (figure 1c).

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<th>Table 1: Test schedule of the test battery</th>
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Figure 2: Individual end product of the test battery. The numbers are the z-scores. A z-score of 0 shows the mean level of all players (red line). The orange line is the score of the player on each subdomain. a) Representation of all 5 subdomains. b) Representation of the physiological characteristics. c) Representation of the technical and tactical characteristics. Group 1 are the worst 25%, group 4 the best 25%.
In the end, the test battery will give insight in a multidisciplinary approach on the talent development process in water polo. The test battery is usable to monitor progress, keep track in the injury process and can be used for talent identification purposes in the end.

Menno de Vries: “Especially in the development of the talents, this battery has the potential for practical use. If I would have the possibilities, I would also use it for selection purposes. However, I have a little amount of players to select from. I do think it would work on national level where there is more need of a selection procedure considering a higher amount of players to select from.”

The identification and development in water polo can be improved to reach a high performance level in the end. Furthermore, since there are specific characteristics per position in the field, the test battery can also be used for selection based on position. Demands of the position can be compared to the characteristics of the player and optimize their capacities.

In the end, this test battery will contribute to the improvement of the talent development in youth water polo talents. Ultimately, the test battery can be used for talent identification and help the Dutch team climb the international ladder in water polo.

References