The Dutch Diving Fitness Test;

defining the normal ranges of a test battery

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Samenvatting

In 2000 is in schoonspringen een Nederlandse fitheidstest geïntroduceerd (Dutch Diving Fitness Test). Mede op basis van het testresultaat worden beginnende schoonspringers ingedeeld in een lesgroep "recreatief" of "wedstrijdgericht". De test is overgenomen uit Mexico. Het doel van dit onderzoek is referentiewaarden vast te stellen voor Nederlandse schoolkinderen.

In de periode september 2004 – juni 2008 zijn 442 schoolkinderen getest op 10 fysieke testonderdelen. De meetwaarden worden gepresenteerd per geslacht en leeftijdsgroep. Er worden een aantal aanbevelingen gedaan voor het gebruik van de test. De resultaten van dit onderzoek zijn niet alleen relevant voor professionals werkzaam in de sport schoonspringen. Onderdelen van de test kunnen worden gebruikt door professionals die sportende kinderen willen testen.

Summary

In 2000 the dutch diving fitness test (DDFT) for novice divers was introduced. Coaches can use the test to direct divers either to a recreational or a competitive training program. The test is a modification of a Mexican diving fitness test. The goal of this study is to define the normal ranges of the test results for Dutch schoolchildren.

In the time frame of September 2004 through June 2008, 442 schoolchildren were tested on 10 items of physical performance. The measurement values are presented by gender and age group. Recommendations are made on the execution of the test. The results of this study are not only relevant to those who work in the field of springboard and platform diving. Parts of the test may be relevant to other professionals who test children in sports.

Trefwoorden: schoonspringen; fitheidstest; kinderen; selectie
Key words: springboard and platform diving; fitness test; children; selection

Introduction

In 2000 the Royal Dutch Swimming Federation (KNZB) invited the head coach of the successful Mexican Olympic diving team, Mister Fransisco Rueda, to speak on diver selection. He presented a test with eight physical performance items.[1] The test came with a table for the conversion of measurement values to test score. Each test item could receive a maximum of 5 points, for a test total of 8 items x 5 = 40 points.

From 2001 on, the diving club in the city of Amersfoort, has started using the Mexican diving fitness test to select novice divers for recreational or intensified training groups. The goal of this study is to define the normal ranges for Dutch schoolchildren on a modified version of the Mexican test, here introduced as the Dutch Diving Fitness Test (DDFT).

Literature

In three major databases, the Canadian Sports Information Research Centre (SIRC), Pubmed and the German Bundesinstitut für Sportwissenschaft (BISP) a search was undertaken using the terms "springboard diving AND fitness and springboard diving AND talent. This search produced a total of six references. After reading the titles or summaries of these six references none was considered helpful for this study.

A second search for literature, using the same search terms, was undertaken in an annotated bibliography of springboard and platform diving literature, compiled by the author over a period of 20 years. The bibliography contains more then 3500 references of publications on springboard and platform diving and is available on the internet. The references can be characterized as: publications in diving magazines; pages in coaches' education manuals; chapters in books on swimming and diving; masters or PhD theses; papers presented at a congress and unpublished research results of swimming federations. Table 1 shows an overview of seven publications that describe the testing of novice divers.[1,2,3,4,5] The table only reflects test items that were specifically mentioned in the articles. Three test procedures last one day, four test procedures last from three months to two years. Three test procedures are aiming at selecting divers for state supported elite training programmes.[2,4,5] Two test procedures are aiming at increasing the number of divers at the club level.[2,3] One test is recommended as a quick scan throughout the diving career to assess strengths and weaknesses in diving fitness.[1] Several test items are included in five or more of the test procedures (e.g. flexibility in pike). For the dutch test it was decided to add body height and body weight to the Mexican test.

> **"A possible way of evaluating the DDFT is by looking at the success of the divers that have been selected with the DDFT in a few years from now"**

Methods

The sports council of the city of Amersfoort, organizes an introduction into diving for elementary school children. Every season more then 100 children ages 7-13 get a chance to participate in a six week, one hour per week beginning diving course at a minimal cost. A season is defined as a school year: September through June. The course is given by the coaches of the local diving club. In the 5th week the DDFT is administered in a small gym, immediately adjacent to the diving pool. Ten children can be tested by one administrator per hour. All test administrators are adult, qualified diving coaches. The following materials are required to complete the test: a scale for bodyweight; a measurement tape for body height and long jump; a ruler for toe point; a padded elevated surface for test item 6 (back extensions); and a stopwatch. The gym must have at least 15 meters floor space to accommodate test item 10 (4 x 10 meter sprint). The test items are always presented to the divers in the same order: item 1 through item 10. All test items are limited to 20 seconds, if time is applicable.

Table 2 describes the ten test items at the start of the study (September 2004). The Mexican test item "modified pull ups" was replaced by push ups from the knees (test item 4), because for the push ups no equipment is necessary. Test items 3-8 are illustrated by Figures 1-9. Parents of the divers have given informed consent.

The main task for this study was to structure the collection of data for analysis. In total 6 test administrators were instructed twice per season to measure and score test items in a uniform manner as described in Table 2.

The measurement values were analysed grouped by gender and age. The measurement values will be used to construct a conversion table for a total test score based on percentiles. Table 3 illustrates the conversion system from measurement value to test item score. The top 10 percent measurement values per test item (P90) will receive 5 test points; the following ten percent (P80) will receive 4 test points and so on. Measurement values below the top 50 percent (P50) will receive no test points. The maximum test score is 10 items x 5 points = 50 points. Test scores were collected between September 2004 and June 2008.

In the final evaluation all tests will be scored with the newly constructed DDFT conversion table to create a total test score interpretation scale.

This study was not sponsored. The results and discussion are in no way influenced by commercial motives.

Table 1. Contents of seven testing procedures of novice divers. x = the exercise is part of the test.

literature refence	ref. 1	ref. 2	ref. 2	unpublished	ref. 3	ref. 4	ref. 5
nation	Mexico	West Germany	East Germany	West Germany	Canada	Cuba	China
		Aachen		Hannover			
number of testmoments	1	4	3	1	2	3	3
test 1	dryland	dryland	dryland	dryland + pool	dryland	dryland	dryland
test 2		dryland	dryland		pool	dryland	dryland + pool
test 3		dryland + pool	dryland + pool			dryland + pool	medical exam
test 4		dryland + pool					
normal values for testitems	yes	no	yes	no	yes	yes	no
duration of test procedures	1 day	2 years	6-9 months	1 day	1 day	6-12 months	± 6 months
original research					Kerr (1978)6	Danilov (1969)7	
ages	starting at 6	7-8	7-9	6-10	up to 12	starting at 6	5-8
body height		x	x	x	x		x
body weight		x	x	x	x		x
bodybuild / anatomy		2 items	13 items	2 items	3 items	> 10 items	> 10 items
coordination on dryland		3 items	5 items				5 items
obstacle course		1 item	2 items			1 item	
balance and vestibular apparatus			2 items		1 item	2 items	
courage			3 items				
sit ups		x	20 seconds	time to do 10	time to do 5		x
pike ups (variations)	15 seconds					2 items	x
push ups (variations)			45 degrees			x	x
pull ups	modified			x		x	
back extensions (variations)	15 seconds					2 items	
standing long jump	x		x	x	x		x
vertical jump		x				x	
sprint	4x10 meter		1x15 meter			4x10 meter	60 meter
toe point	x	x	x	x		x	
flexibility in pike (variations)	x	x	x		x	x	x
shoulder flexibility	x	x	x	x		x	x
speed of upperbody movement						2 items	
climb a rope						x	
jump rope						x	
armstand							x
aerobic stamina						400 meter run	400m + 800m
test items in the pool				5 dives	4 dives		
medical examination							x
final evaluation							
qualifying point score	> 30 of 40		> 34 of 68				
speed of learning diving skills		x	x			x	x
physical progress		x	x			x	x
competition results		x					
courage			x				x
character							x
divers desire			x			x	x
parental support			x		x		

Table 2. the ten test items of the Dutch Diving Fitness Test (DDFT), September 2004.

Item	Title	Description
1	Body height	Body height in cm, standing, bare-feet.
		Reason: short stature is considered advantageous for diving.
		Measurement error: shoes, bent body posture.
2	Body weight	Bodyweight in kg, standing, wearing shirt + short.
		Reason: light weight is considered advantageous for diving.
		Measurement error: shoes.
3	Toe point	The diver is sitting on a mat, with straight legs and the ankles plantair flexed. The tester measures the distance from the bottom of the big toes to the floor in cm.
	(Figure 1)	Reason: curving the feet graciously during dives scores extra judges points.
		Measurement error: bent knees; if one toe is much closer to the floor than the other, take the average of the two toes to the floor.
4	Push ups from the knees	The diver is laying on the floor, face down, hands next to the shoulders, the knees bent (feet in the air); repetitions in 20 seconds.
	(Figure 2 + 3)	Reason: represents upper body strength.
		Measurement error: poorly executed repetitions do not count.
5	(Semi-) pike ups	The diver is laying on the floor, face up, arms extended past the head, hands slightly above the floor, the legs are straight up (90 degree angle in the hips). In the pike up the diver touches the toes and then the floor; repetitions in 20 seconds.
	(Figure 4 + 5)	Reason: represents strength of the hip flexor muscles.
		Measurement error: poorly executed repetitions do not count.
6	Back extensions	The diver is laying on a table or platform, face down. The upper body is over the edge and hanging towards the floor. The hands are folded in the neck. A second diver prevents the first diver from falling, by sitting on the legs. The diver extends from the hanging position to the horizontal; repetitions in 20 seconds.
	(Figure 6 + 7)	Reason: represents lower back muscle strength.
		Measurement error: poorly executed repetitions do not count.
7	Stand and reach	The diver is standing on a raised surface (step or table) and bends forward, with straight legs. The diver reaches with both index fingers past the toes and touches a measurement tape.
	(Figure 8)	Reason: represents maximal flexion in the hip with straight legs
		Measurement error: bending in the knees. Minimal score = 0 (no negative score if not touching toes).
8	Shoulder flexibility	The diver is laying on a mat, the forehead touches the mat. The diver extends his arms along the head and holds a pen in two fists. The diver raises his arms along a measurement tape, the forehead remains on the mat.
	(Figure 9)	Reason: represents the range of motion of the arms overhead, important for the water entry position.
		Measurement error: pushing the pen upward with the fingers, bend arms, the forehead lifts of the ground.
9	Standing long jump	Long jump, from standing to standing, with arm swing. The jumping distance is from the front of the toes (start) to the back of the nearest heel (landing).
	3 attempts	Reason: represents explosive leg power.
		Measurement error: the feet slide forward on impact, the diver falls on landing.
10	4 x 10 meter sprint	4 x 10 meter sprint (dash), on a 10 meter track; At 10, 20, 30 and 40 meters the diver touches a marking point on the floor (e.g. a 30 cm cone).
	2 attempts	Reason: represents: speed and agility.
		Measurement error: inaccurate use of the stopwatch.

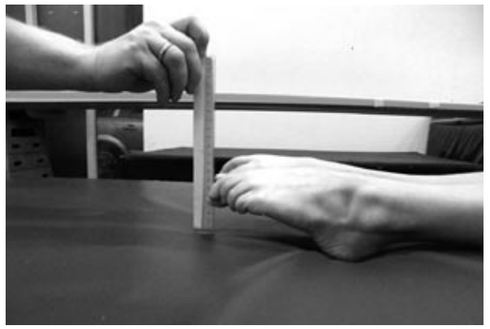

Figure 1 test item 3, toe point

Figure 2 test item 4, push ups start

Figure 3 test item 4, push ups middle position

Figure 4 test item 5, semi pike ups start

Figure 5 test item 5, semi pike ups middle position

Table 3. conversion system from measurement value to point score; only the top 50% receive points.

measurement value	P	test item score
percentile 90-100	P_{90}	5 points
percentile 80-89	P_{80}	4 points
percentile 70-79	P_{70}	3 points
percentile 60-69	P_{60}	2 points
percentile 50-59	P_{50}	1 point
percentile < 50	< P_{50}	no points

Results

In the time frame 442 children were tested: 327 girls and 115 boys with ages between 7 and 13 years. Table 4 shows the averages and standard deviations of the measurement values obtained from the ten test items. Most measurement values were obtained in the age groups 8+9 and 10+11 years. Test item 5 proved difficult for many children to perform correctly. In those cases where the test administrators indicated doubt on the exact number of correct repetitions the measurements are not presented. Therefore, test item 5 (semi-pike ups) was replaced by test item 11 (hanging tuck ups) at the start of the third season of measurements, September 2006 (Figure 10+11). Table 5a shows the description and Table 5b the obtained measurement values for test item 11.

Table 6 represents the proposed DDFT (version 2008), for novice divers. With this table the test administrator can convert a measurement value into a test score. The conversion is based on percentiles, as illustrated by Table 3. Table 6 shows the age categories 8+9 and 10+11 years, for boys and girls. Only a few children in the ages of seven, twelve and thirteen participated in the four seasons of this study. Therefore these ages were not included in Table 6.

To create Table 7 all tests performed from September 2006 onward (with the new test item number 5) were rescored using Table 6. Table 7 shows the top 50% (P90-P50) of the total test scores per age group and gender. Table 7 helps to interpret the final test score of a diver on the DDFT.

Table 4. Measurements obtained from the ten test items; averages and standard deviations.

	girls				boys		
	7	8+9	10+11	12+13	8+9	10+11	12+13
item 1	132 ± 4.4	138.6 ± 6.3	149.2 ± 7.3	157.8 ± 6.4	139.7 ± 6.6	149.3 ± 6.9	160 ± 5.3
height	n = 3	n = 140	n = 150	n = 20	n = 63	n = 38	n = 3
item 2	30 ± 1.7	32.3 ± 5.2	39.3 ± 7.2	46.9 ± 11.5	32.1 ± 4.2	38.3 ± 5.4	45.7 ± 1.2
weight	n = 3	n = 139	n = 149	n = 20	n = 63	n = 38	n = 3
item 3	5.1 ± 1.4	6.8 ± 1.7	7.9 ± 2.2	8.5 ± 2	7.3 ± 2.1	9 ± 1.9	7,3 ± 0.6
toes	n = 4	n = 149	n = 154	n = 20	n = 66	n = 45	n = 3
item 4	18.3 ± 1.5	14.4 ± 3.7	13.6 ± 4	12.4 ± 4.7	15.6 ± 3.5	16 ± 3.1	23 ± 8.2
push ups	n = 3	n = 73	n = 98	n = 8	n = 40	n = 32	n = 3
item 5	14.3 ± 5.9	12.7 ± 4.4	13.9 ± 4.5	13.5 ± 3.6	10.3 ± 4.7	11.5 ± 4.9	14
pike ups	n = 3	n = 43	n = 65	n = 6	n = 19	n = 15	n = 1
item 6	13.8 ± 2.6	14.9 ± 3.4	15.9 ± 2.9	15.3 ± 2.3	15.3 ± 3.5	16.2 ± 3.3	16 ± 2.6
back	n = 4	n = 125	n = 128	n = 17	n = 43	n = 40	n = 3
item 7	7.3 ± 5.7	4 ± 4.2	4 ± 4.1	3.8 ± 4.8	1.8 ± 2.7	2 ± 3.1	0 ± 0
reach	n = 4	n = 149	n = 154	n = 20	n = 66	n = 45	n = 3
item 8	30.3 ± 14.4	25.8 ± 7.1	28.5 ± 6.8	27.8 ± 10.7	22.3 ± 12.9	25.4 ± 12.1	23.3 ± 2.9
shoulders	n = 4	n = 149	n = 154	n = 20	n = 66	n = 45	n = 3
item 9	146.3 ± 23.8	139.9 ± 22.4	148.4 ± 16.3	158.2 ± 25.6	150.8 ± 14.8	160.3 ± 20.1	155 ± 37.4
long jump	n = 4	n = 149	n = 154	n = 20	n = 67	n = 45	n = 3
item 10	12.55 ± 1.49	11.62 ± 1.24	11.25 ± 0.64	10.83 ± 0.74	11.22 ± 0.71	10.88 ± 0.73	10.53 ± 0.19
sprint	n = 4	n = 149	n = 153	n = 20	n = 67	n = 45	n = 3

Figure 6 test item 6, back extensions start

Figure 7 test item 6, back extensions middle position

Photo 8 test item 7, stand and reach

Figure 9 test item 8, shoulder flexibility (prone).

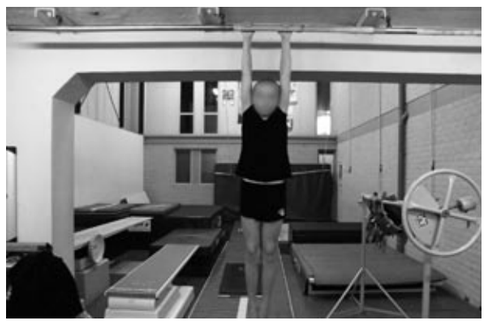

Figure 10 test item new, hanging tuck ups start

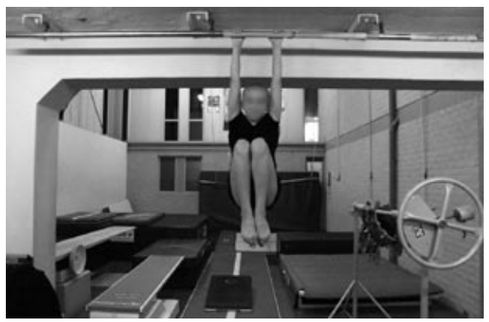

Figure 11 test item new, hanging tuck ups, middle position

Table 5a. test item 11 replaces test item 5, midway in the study, September 2006

Item	Title	Description
11	Hanging tuck ups	The diver is hanging by the arms on a bar; the feet are off the ground. The diver lifts both knees towards the chest. A helper prevents swinging; repetitions in 20 seconds.
	(Figure 10 + 11)	Reason: represents strength of the hip flexor muscles.
		Measurement error: poorly executed repetitions (hip flexion less then 100°) do not count.

Table 5b. test item 11: average and standard deviations of measurement values.

	girls				boys		
age	7	8+9	10+11	12+13	8+9	10+11	12+13
item 11		16.1 ± 2.3	16.6 ± 3.5	16.1 ± 2.5	16.9 ± 2.1	15.1 ± 3.9	18
tuck ups	n = 0	n = 48	n = 38	n = 7	n = 20	n = 15	n = 1

Table 6. Conversion table for the proposed Dutch Diving Fitness Test, 2008. Test item 5 is "hanging tuck ups"

test item	girls 8 + 9	girls 10 + 11	boys 8 + 9	boys 10 + 11	test points
item 1	131 and <	140 and <	131 and <	142 and <	5
height	132-133	141-144	132-133	143-144	4
cm	134-135	145	134-137	144-145	3
	136-137	146-148	138-139	146-147	2
	138-140	149-150	140-141	148	1
item 2	27 and <	31 and <	26 and <	33 and <	5
weight	28	32-34	27-28	34	4
kg	29	35	29-30	35	3
	30	36-37	31	36	2
	31	38-39	32	37-38	1
item 3	5 and <	5 and <	4.5 and <	7 and <	5
toe point	5.5	5.5-6	5	7.5	4
	6	6.5	5.5-6	8	3
	6.5	7	6.5	8.5	2
	7	7.5-8	7-7.5	9	1
item 4	19 and >	19 and >	20 and >	20 and >	5
push ups	17-18	18	19	19	4
from knees	16	15-17	18	18	3
20 sec	15	14	16-17	17	2
	14	13	15	16	1
item 5	19 and >	20 and >	20 and >	19 and >	5
hanging	18	19	19	18	4
tuck ups	17	18	18	17	3
20 sec	16	17	17	16	2
	15	16	16	15	1
item 6	19 and >	19 and >	20 and >	20 and >	5
back	18	18	19	19	4
extensions	17	17	18	18	3
20 sec	16	16	17	17	2
	15	15	16	16	1
item 7	10 and >	9 and >	7 and >	6 and >	5
stand	7-9	7-8	4-6	2.5-5	4
and	6	5-6	3	2	3
reach	4-5	4	2	1.5	2
	3	3	1	1	1

test item	girls 8 + 9	girls 10 + 11	boys 8 + 9	boys 10 + 11	test points
item 8	35 and >	38 and >	35 and >	37 and >	5
flexibility	30-34	35-37	30-34	32-36	4
in shoulders	29	32-34	28-29	30-31	3
	28	30-31	25-27	29	2
	26-27	29	24	27-28	1
item 9	164 and >	169 and >	171 and >	182	5
long jump	157-163	162-168	162-170	180-181	4
	150-156	158-161	156-161	175-179	3
	145-149	152-157	152-155	169-174	2
	141-144	148-151	150-151	160-168	1
item 10	10.71 and <	10.43 and <	10.4 and <	9.95 and <	5
4x10 meter	10.72-10.94	10.44-10.67	10.41-10.73	9.96-10.21	4
sprint	10.95-11.26	10.68-10.88	10.74-10.85	10.22-10.53	3
	11.27-11.44	10.89-11.13	10.86-10.94	10.54-10.60	2
	11.45-11.62	11.14-11.28	10.95-11.04	10.61-10.94	1

Table 7. Interpretation guide for the total test score on the DDFT: percentile scores per age and per gender.

	age	n	P_{90}	P_{80}	P_{70}	P_{60}	P_{50}
girls	8+9	66	28	22	20	18	16
girls	10+11	70	27	22	17	15	13
boys	8+9	32	25	22	18	15	13
boys	10+11	20	25	21	20	15	12
interpretation			top 10%	top 20%	top 30%	top 40%	top 50%

Discussion

The goal of this study was to define the normal ranges for Dutch schoolchildren on a test battery for springboard diving. Table 6 shows the results for ten test items. This table can be used by diving coaches to convert measurement scores into a total fitness score for novice divers. Table 7 can be used by the test administrator to interpret the total test score.

Eight test items were taken from an existing (Mexican) test. One test item was altered, pull ups were exchanged for push ups. Two test items, body height and body weight, were added to the test, because they are often used in other diving fitness tests. There is evidence that body size matters in achieving success in diving[8,9] and other acrobatic sports.[10] Most test items used are common exercises in many other sports. Therefore, the results of this study may be of interest to professionals who test children in other (acrobatic) sports.

In this study the majority of the tested children are girls. This reflects the state of the sport in The Netherlands: two-third of the club members is female. Although the diving introduction course is open to children ages 7-13, only few children in the ages of seven, twelve and thirteen participated in the four seasons of this study. In other countries children are tested for diving fitness at six or even five years of age. It takes on average 10 years to become a participant at the international senior level and often longer to become an international champion[10]. The collection of measurement values for beginning Dutch divers ages six and seven seems warranted. This is, however, not easy. First, the DDFT has been administered to a few 6-year old club divers. Explaining the correct execution of the test items to children of this age is difficult. It takes patience and extra attempts at test items for the test administrator to obtain reliable measurements. Second, Dutch parents rarely bring their children to diving lessons before the age of 8.

For test items 4, 5 and 6 respectively, less measurement values have been presented than for some of the other test items (Table 4). This is because these test items require an interpretation by the test administrator of the number of correctly performed repetitions. In a number of cases the test administrators indicated doubt on the exact number of correct repetitions. In these cases the measurement values were disregarded. In this study the test administrators were instructed in uniform scoring repetitively, but no attempt was made to quantify test-retest reliability and inter-administrator consistency.

Test item 5, semi-pike ups, was found to be the most difficult exercise to perform correctly for the novice divers, because of a lack of hamstring flexibility. Test item 5 was replaced by test item 11, hanging tuck ups. This item tests a similar action of the body (hip flexion), but is less influenced by hamstring flexibility of the diver.

Table 6 has been compared to the conversion table that came with the original test from Mexico. The following generalisations can be made: Dutch children score better on test item 10 (4x10 meter sprint) and score much worse on test item 7 (stand and reach) and test item 8 (shoulder flexibility). In many of the other test items, smaller differences were present. Overall, Table 6 is quite different from the Mexican conversion table. This confirms the necessity of the current study.

All test items receive a possible five points. Most diving coaches find some test items more important than others. This is because they assume that there is a time window of opportunity to train children on motor abilities. For example, the best time to increase flexibility is between five and eight years old.[11] In the selection test of former East Germany divers who showed deficiencies in some test items could still be accepted into the elite training program. Low scores on the test items for flexibility however automatically led to rejection[2]. Other coaches consider the ability to jump the most important test item.[12] To interpret the final test score of children tested in the DDFT, coaches should not only study the total test score, but also the results on all ten test items separately.

The number of divers selected for a team depends not only on the performance of the diver on the selection tests, but also on the number of training places available. If the number of places is limited and the number of children trying out is very large, only the very best are accepted.[1] If the diving club uses a testing scheme to gain new members, more than 25% of the tested children are invited to join the club.[2] In the city of Amersfoort, children with 25 points out of 50 on the DDFT are invited to join the club selection of "competition trainees", others are referred to recreational diving classes. Setting the standard at 25 points brings for this club the right balance between adequate fitness of the beginning diver for the training program and the number of places in the intensified training group.

It is a common mistake to confuse a fitness test for a talent identification procedure. Current best practice in the complex field of talent identification emphasizes that fitness testing is only a part of a talent "confirmation process" that should last at least 3-6 months.[13] It is interesting to note that in the sport of competitive diving successful nations use such a modern talent identification process already for more than 20 years (Table 1).[2,4,5]

It is impossible to scientifically prove the predictive value for diving success of the DDFT in a comparative study. Selected and non-selected divers do not receive the same training opportunities. It can therefore not be determined whether children with a low score on the DDFT can reach the same standard of diving as children with a high score on the DDFT. A possible way of evaluating the DDFT is by looking at the success of the divers that have been selected with the DDFT in a few years from now. This strategy was used in two studies[8,9]. In the former Soviet Union, 59 factors were evaluated on their predictive power for diving success during a three year period: 1977 through 1980. The following factors were statistically different in successful divers: height, weight, chest circumference, shoulder width, calf circumference, vertical jump and hanging pike-ups.[8] In the United States, 121 boys and 151 girls participating in the junior Olympic diving festivals of 1991 and 1992 were tested on multiple items. Ten years later it was evaluated which of

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these successful junior divers became successful senior divers. Statistically significant factors for girls were: a start in gymnastics, small and light posture, late menarche, less fat and more muscle. Important factors for boys were: the scores on sit ups, sit and reach and a quadrant jump.[9] A similar evaluation of the DDFT in the future could lead to a weighted scoring system, in which some test items receive more than five points, others less, based on their predictive power for diving success.

Conclusions

The Dutch Diving Fitness Test is a practical tool to test physical performance of novice divers. The test is used to guide divers to the appropriate training group, recreational or competitive. Four hundred and forty two Dutch schoolchildren were tested on 10 test items to define the normal ranges of this test. The results of this study are not only relevant to those who work in the field of springboard and platform diving, but may be relevant to professionals who test children in other (acrobatic) sports.

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