



The optimising of the physical conditioning

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INTRODUCTION

Team handball is a fast paced game that requires high-intensity movements which are to be repeated over time, and are based on technical and tactical situations. Handball training should then be characterised by acyclic activities and intermittent-like drills to maximise specific improvements. An important part of the training is physical conditioning. It is a very complex process. To optimise this process, it is necessary to have sufficient information. The data about the level of motoric abilities (both general and specific abilities) constitute not only the base for the planning of the training, but also serves as an efficiency measuring tool. Having enough information, the handball coach is then able to know and understand the intensity and the physiological demands of his/her drills and is able to plan his/her training sessions accordingly.

There are more ways of obtaining information concerning the level of motoric abilities. Of course, all measurements taken in laboratories are more accurate. However, this investigation is (for economic reasons) only available to the top teams and clubs. Moreover, for the interpretation and the utilisation of results from the laboratory measurements, very close collaboration between the coach and the biological science specialist (maybe in other sciences) is necessary.

For the lower ranked teams we need a simple way to measure the level of motoric abilities.

The method has to be useful in ordinary training when using available measuring equipment.

This is why the motor tests constitute a basic source of information about the level of motoric abilities. Since handball is a very complex sport, we need a battery of tests to evaluate all factors that can influence the games performance.

This system of control has been used in the Czech Republic; it also contains a standard battery of tests for motion performance including the requisite. It enables a comparison of the level of conditions achieved by training with normative indicators, which generates a basis for revising the training load.

METHODS

Since the battery of tests is standardised and has a verified validity for the performance criteria (BLAHUŠ, ŠAFARŽÍKOVÁ, TÁBORSKÝ 1982), it is possible to utilise it at present. It is usually a long-term process to create the normative indicators and amongst other things it requires a sufficient amount of data. Setting new standard motoric tests depends on the collection of a sufficient amount of data which will take several years. The last update of the normative tests were realised in 2005.

The tests consist of the following:

Running 2x15m, dribble 30m, five jumps, ball throw, running 10x20m, Cooper test (12 minutes running)

Each test is an indicator of a different motoric ability. The movements that create content of the tests are currently used in the game. We will now describe the tests and the method of measurement.

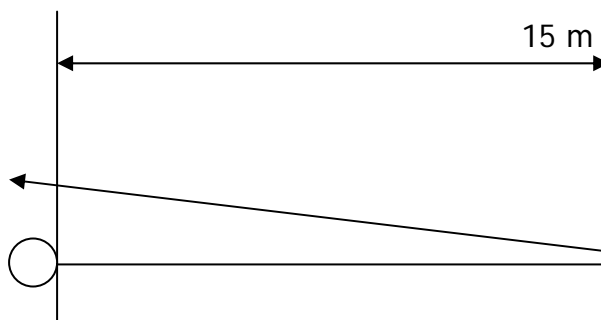


Running 2x15m

(Indicates velocity of running with a change in direction)

The distance of 15m is marked by two parallel lines. The participant starts from one of them on a starting signal. The change of the direction is allowed only after the other line is touched. The amount of time taken to cross the second line is recorded (Figure 1).

Figure 1



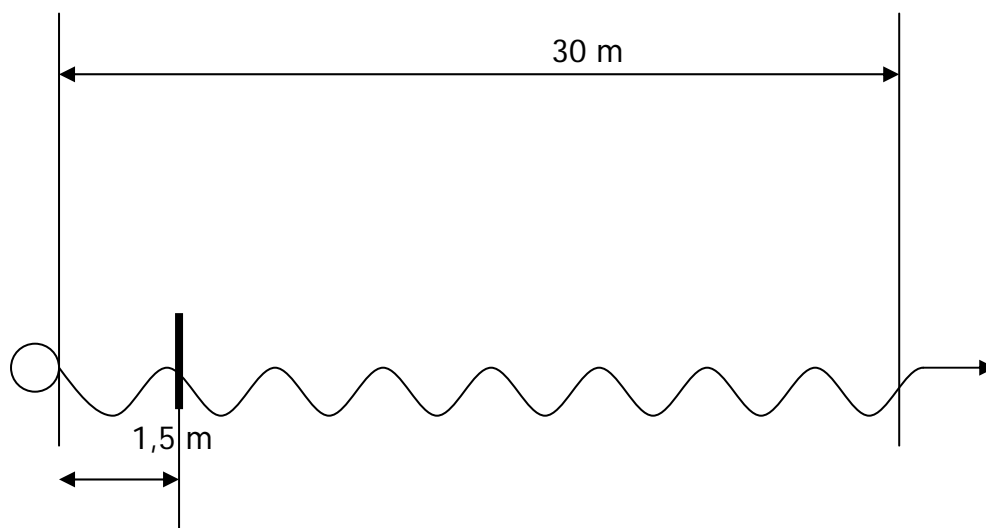
Each player has to run twice

30m dribble

(Indicates dribbling skill)

The distance of 30m is marked with two parallel lines. The participant starts from one marker on a starting signal. The first bounce of the ball must be realised within the area distance of 1.5 meters, which is marked by a short line. The participant has to catch the ball after crossing the second line. The amount of time taken to cross the second line is recorded (Figure 2).

Figure 2



Each player has to run twice

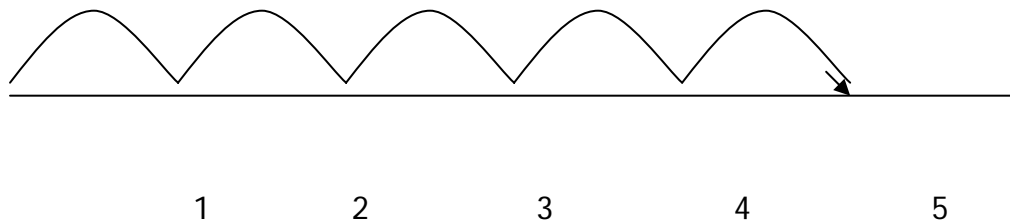


Five jumps

(Indicates “take-off” force of legs)

The measuring tape is extended on the floor. The participant stands on the jumping leg behind the starting line. He/she performs five jumps only on their jumping leg (the last landing might be on both legs) without a break (Figure 3). The distance from the starting line to the point of last contact of the leg (or other part of body) with the floor is measured.

Figure 3



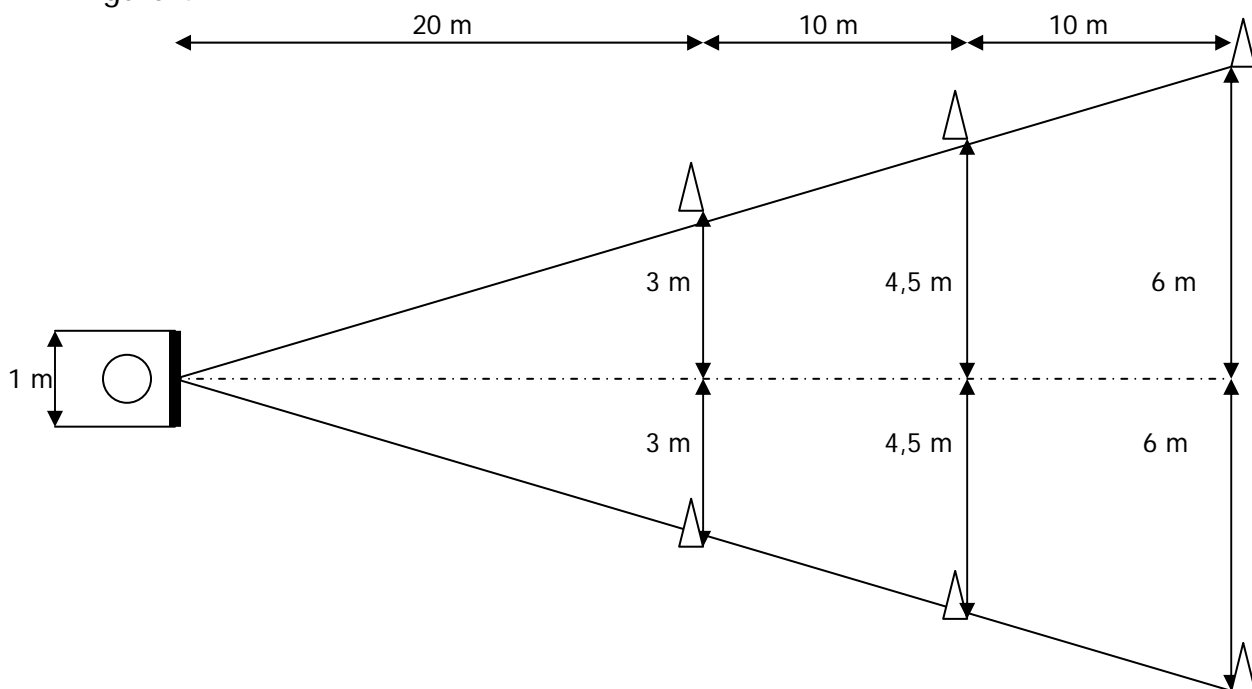
Each player has to jump three times

Ball throw

(Indicates the swinging force of arms)

The participant stands behind the line and throws a lightweight (for women and children) or a 1 kg ball (men) as far as possible in the marked sector. During the throw the player must have constant contact with the ground with at least some part of one leg (like the 7m throw). The player is not allowed to step over the line until the ball is thrown and has three immediate subsequent attempts. We recorded the length of the throw with precision to 0.1m (Figure 4).

Figure 4





10x20 m run

(Indicates special endurance)

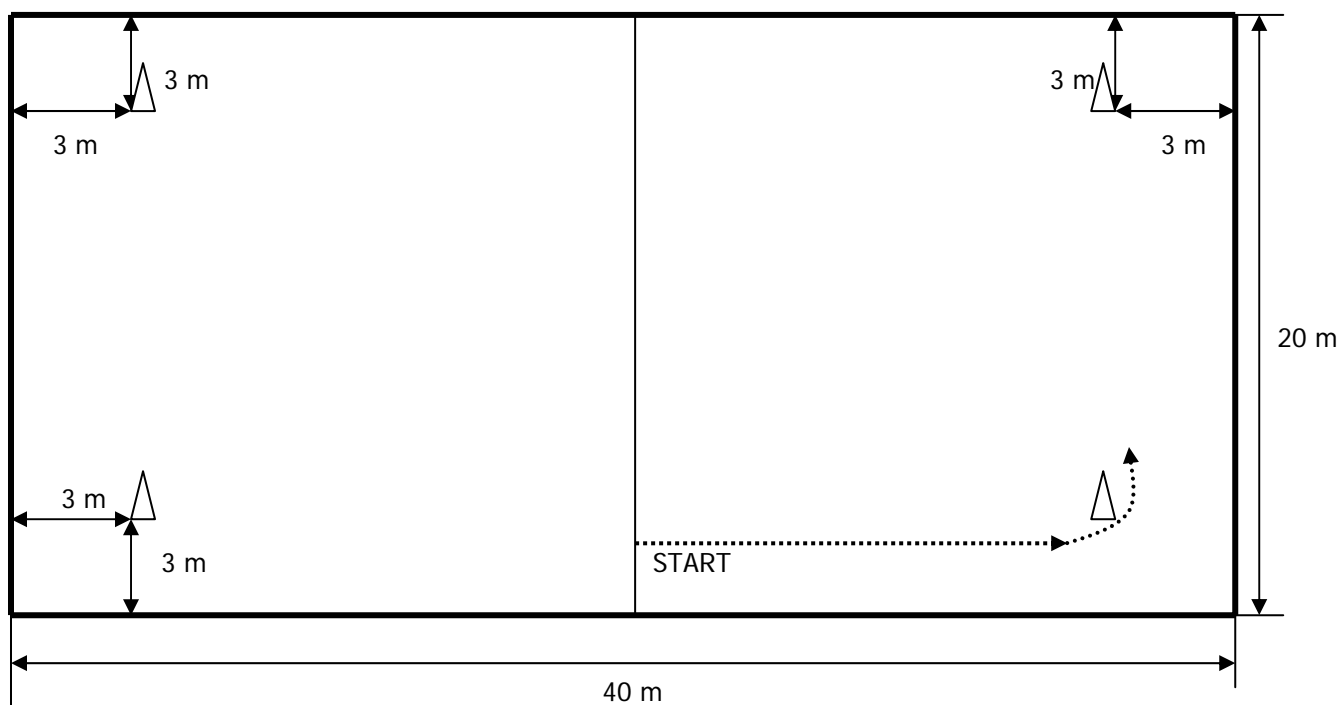
The distance of 20m is marked with the outer goal line and centre line. The participant starts from the centre line and runs repeatedly ten times. The change in the direction is only allowed after the other line has been touched. The time taken from the start and crossing the centre line for the tenth time is recorded. Each player has to run once.

12 minute run

(Indicates endurance)

A 100m distance is marked on the playing court with the 4 cones (Figure 5). The players run continuously for 12 minutes. The test is brought to an end with an audio signal (whistle). Immediately afterwards the players have to stop and sit (or lie down) at the place of their last step. It is helpful to note the distance that was covered.

Figure 5



RESULTS

The best young handball players in the Czech Republic are concentrated within the Youth Sport Centre (hereafter referred to as SCM). The controlled system of the training process can be compared to the level of conditions achieved through training with the normative indicators. The controlled measurements are collated biannually when all players convene and perform together in one place. The results are evaluated according to the norms (Table 1)



Boys 15 – 16 years

Table 1: Norms of motoric tests

point	Running 2 x 15 m		30 m dribble		Ball throw	Five jump	Running 10 x 20 m	12 min. run
	Electronic Device	Stop watch	Electronic Device	Stop watch				
0	5,98 or more	5,8 or more	4,92 or more	4,9 or more	18,50 or less	10,35 or less	44,7 or more	2540 or less
1	5,91 – 5,97	5,7	4,84 – 4,91	4,8	18,60 – 19,90	10,40 – 10,80	44,1 – 44,6	2550 – 2620
2	5,84 – 5,90		4,76 – 4,83	4,7	20,00 – 21,30	10,85 – 11,25	43,5 – 44,0	2630 – 2700
3	5,77 – 5,83	5,6	4,68 – 4,75		21,40 – 22,70	11,30 – 11,70	42,9 – 43,4	2710 – 2780
4	5,70 – 5,76		4,60 – 4,67	4,6	22,80 – 24,10	11,75 – 12,15	42,3 – 42,8	2790 – 2860
5	5,63 – 5,69	5,5	4,52 – 4,59	4,5	24,20 – 25,50	12,20 – 12,60	41,7 – 42,2	2870 – 2940
6	5,56 – 5,62		4,44 – 4,51		25,60 – 26,90	12,65 – 13,05	41,1 – 41,6	2950 – 3020
7	5,49 – 5,55	5,4	4,36 – 4,43	4,4	27,00 – 28,30	13,10 – 13,50	40,5 – 41,0	3030 – 3100
8	5,42 – 5,48		4,28 – 4,35	4,3	28,40 – 29,70	13,55 – 13,95	39,9 – 40,4	3110 – 3180
9	5,35 – 5,41	5,3	4,20 – 4,27		29,80 – 31,10	14,00 – 14,40	39,3 – 39,8	3190 – 3260
10	5,34 or less	5,2 or less	4,19 or less	4,2 or less	31,20 or more	14,45 or more	39,2 or less	3270 or more

The player can earn 0 – 10 points in one test. The maximum score for all tests combined is 60 points. Naturally, 30 points is used as the average. To compare the four centres used for the evaluation of boys, the average from results from the ten best players is used.

To compare the performance of boys in the 15-16 year age category, we use the results collected from January 2003 to January 2005 (Table 2).

Table 2: Comparison of average results

M (n=10)	1-2003	8-2003	1-2004	8-2004	1-2005
Centre A	27.9	29.7	35.4	36.1	40.9
Centre B	33.2	23.9	36.1	32.6	42.4
Centre C	24.4	24.0	27.9	27.4	37.4
Centre D	36.0	29.4	31.5	34.6	42.3
M SCM (n = 40)	30.4	26.8	32.7	32.7	40.1

Two trends can be observed:

1. The level of points has a sinuous course. The results from the months of August are weaker than the results from the months of January. In the summer the new players join the teams thus instigating a change in category. It is not possible to prepare the new players in one month to bring them to the similar level of competence where the remaining players, being in the second year of the category, are.
2. The “starting” level (8-2003 and 8-2004) is higher in following year. The new players are better prepared than their team-mates were one year ago. This may be a result of closer cooperation with the trainer in both categories.



CONCLUSIONS

With the information about the level of motoric abilities the coach can plan training units better. We presented one of the ways how to obtain the information. A big advantage is the possibility to make the evaluation of motoric abilities levels last longer through the use of identical instruments. The comparison is then easier. From the group of Czech SCM we used the results average. However, for several coaches the information about an actual player is more important. Longitudinal observation of results in several players enables the training load to be specified on an individual basis. The training then becomes more efficient.

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