

WEIGHT-HEIGHT RELATIONS AS AN IMPORTANT FACTOR OF SUCCESS IN RACE WALKING

**Aleksandar Raković, Daniel Stanković, Ratomir Đurašković,
Jovan Ranđelović and Danica PirsI**

Faculty of Sport and Physical Education, University of Niš, Serbia

Professional paper

Abstract

Race walking is a sports discipline requiring from the athlete, a race walker, a possession of certain anthropometric characteristics which apart from optimally administered training sessions exert some influence on the achievement of the top results in this sport. Serbia has a relatively small number of athletes who go in for and compete in race walking, a sport supposed to animate and appeal a great number of competitors because it is meant not only to have a competitive part but also a recreational one as well. The aim of this research is to present some weight – height relations of the race walkers who had achieved top results at the world championships. These results would prove useful for the coaches and sports experts in their selection of the children for race walking. The research encompassed 55 elite race walkers. The obtained results point to the fact that the average body height is 176, 51 +- 5, 52 cm, and body mass is 64, 85 +- 5, 02 kg. According to the average values of the body mass index (20, 80 +- 1, 07 kg/m²) race walkers belong to the group of lower limit values of the normally nutrition persons. These athletes have on average smaller body mass for 5 kg compared to the ideal body mass calculated by the Lorenz formula.

Key words: *race walking, weight, height, body mass*

Introduction

Race walking is a sports discipline requiring from the athlete, a race walker, a possession of certain anthropometric characteristics which apart from optimally administered training sessions exert some influence on the achievement of the top results in this sport. This especially implies height and weight of the body. Namely, optimal body mass retention in athletes of all sports disciplines presents an important factor in achieving top sports results. Under optimal body mass one implies that mass that enables an athlete to achieve maximum top results. It is extremely important in race walking that optimal body mass correspond to certain body composition of the race walker. First of all one thinks of body height and circular dimension of the race walker's body. A great number of authors researched ideal body mass trying to determine ideal body mass of the particular walker on the basis of his body height. Only in athletics does each discipline require different body mass whereas body height remains the same. So in sprinters optimal body mass is different in relation to long distance runners, shot putters, high jumpers, marathon runners and the like, let alone other sports fields. Determination of the optimal body mass of each athlete has channeled the aim of this paper.

The main purpose of this research is to point out to the significance of the height- weight relations of the elite race walkers and to determine exactly the relations that are crucial for the estimation of the optimal body mass that would be one of the hosts of factors significant for the cusses in race walking.

Method

Research is conducted on the sample of the elite 55 race walkers at 50 km of average age 27,69 +- 4,68, and 30 elite race walkers at 20 km, of average age 27,02 +- 3,90. On the basis of the body height and body mass an ideal body mass was calculated according to the Lorenz formula: $ITM = (VT - 100) = (VT - 150 \times 0,25)$, VT body height in cm, Body mass index was calculated according to the formula: $BMI = MT/VT^2$: MT – body mass in kg, VT body height in m, and Kettle's index according to the formula: $TVI = MT/VT$: MT – body mass in gr, VT body height in cm. Tables have shown following variables coded as: age (GSTAR), body height in cm (AVIST), body mass in kg (AMAST), ideal body mass according to Lorenz in kg (AITEM), body mass index in kg/m² (BMASI), Kettle's weight-height index in gr/cm (KETELI) and achieved time in 1999 in min. (TIME).

Results

Tables show basic statistical parameters of the body mass and height, ideal body mass, Kettle's weight-height index of elite race walkers at 50 km.

Table 1. Basic statistical parameters of the body mass and height, ideal body mass, Kettle's weight-height index of elite race walkers at 50 km.

VARIABLE	MEAN	SD	CV	MIN	MAX
GSTAR	27,69	4,68	16,90	19,00	43,00
AVIST	176,51	5,52	3,12	163,00	188,00
AMAST	64,85	5,02	7,74	53,00	77,00
AITEM	69,88	4,14	5,92	59,75	78,50
BMASI	20,80	1,07	5,14	17,30	23,18
KETLI	367,13	21,14	5,76	302,86	418,48
TIME	235,56	9,90	4,20	219,54	267,50

Table 2. Basic statistical parameters of the height, body mass, ideal body mass, Body mass index, and Kettle's weight-height index of elite race walkers (at 20 km)

VARIABLE	MEAN	SD	CV	MIN	MAX
GSTAR	27,02	3,90	14,43	20,00	35,00
AVIST	176,91	4,73	2,67	168,00	186,00
AMAST	66,17	6,03	9,11	51,00	78,00
AITEM	70,18	3,54	5,04	63,50	77,00
BMASI	21,11	1,40	6,63	17,64	24,72
KETLI	373,71	28,10	7,51	300,00	427,77
TIME	130,57	2,26	1,73	125,20	134,59

Table 3 Statistical significance of differences in arithmetic means of the body height, body mass, ideal body mass, body mass index and Kettle's weight-height index of elite walkers at 20 and 50 km

VARIABLE	HODAI 50 KM		HODAI 20 KM		P	T
	MEAN	SD	MEAN	SD		
GSTAR	27,69	4,68	27,02	3,90	0,67	> 0,05
AVIST	176,51	5,52	176,91	4,73	-0,37	> 0,05
AMAST	64,85	5,02	66,17	6,03	-0,87	> 0,05
AITEM	69,88	4,14	70,18	3,54	-0,34	> 0,05
BMASI	20,80	1,07	21,11	1,40	-1,15	> 0,05
KETLI	367,13	21,14	373,71	28,10	-1,22	> 0,05

Table 4 Basic statistical parameters of the height, body mass, ideal body mass, Body mass index, and Kettle's weight-height index of 5 elite race walkers at 50 km and values of the most successful Serbian walker Rakovic.

VARIABLE	5 BEST WALKERS ON 50 KM					RAKOVIC
	MEAN	SD	CV	MIN	MAX	
GSTAR	27,60	2,19	7,93	24,00	30,00	32,00
AVIST	173,60	4,87	2,80	168,00	181,00	184,00
AMAST	64,00	3,53	5,51	60,00	69,00	74,50
AITEM	67,70	3,56	5,26	63,50	73,00	75,50
BMASI	21,52	0,80	3,72	20,58	22,60	22,04
KETLI	368,48	11,90	3,23	357,14	381,50	410,33

Analyzing results shown in Table 1 one can state that the average age of the race walkers at 50 km is 27, 69 +- 4, 68 and that the range between the youngest and the oldest walker is 24 years. This age heterogeneity is also reflected in the variation coefficient. Namely, 16.90% of walkers differ in age from the average age. Average body height of the walkers is 176, 51 +- 5, 52 cm and is within the limits of the non-athletes average body height. Difference between the biggest and the smallest body height values is 18 cm and apart from that variation coefficient points to the great homogeneity in this discipline. (Cv=3, 12%). Average walking time at 50 km is 235, 56 +- 9, 90 min (3.42.41). Variation coefficient points to the fact that only 4, 20% of walkers differ in time of walking this track from the average result.

Discussion and conclusion

By analyzing the results of the best 5 walkers in the world at 50 km one gets the following results: Average age is 27,6 +- 2,19, body height is 173,60+-4,87 cm, body mass is 64,0+-3,53 kg and is less than 3,7 kg when compared to the ideal body mass calculated according to Lorenz formula (67,70+-3,56 kg). Body mass index is 21,52+-0,80 kg/m², Kettle's weight-height index in gr/cm is 368,48+-11,90gr/cm, and walking time is 3,41.30+-0,13 hours. Results show that the first five walkers are on average of smaller body height values in relation to all walkers at 50 km but not statistically significant, they are of the same body mass, somewhat higher values of Body mass index and Kettle's weight-height index

(Table 5). Results shown in Table 2 point to the fact that average age of the walkers at 20 km is identical to the average age of the walkers at 50 km which is the same for the average body height. Body mass of the 20 km walkers is bigger. Analyzing results shown in Table 3 we can state that there is no statistical significance of differences in analyzed weight-height relations and well as in height and body mass of the 50 and 20 km race walkers. It is important to state that there is numerical difference in body height and body mass and weight-height relations with a remark that these values are bigger in 20 km walkers. Analyzing results of 5 elite race walkers at 50 km and values of the most successful Serbian walker Rakovic we can state that the values of Rakovic in all analyzed variables are by far above average and maximal values of the best race walkers. Body mass of the walkers is -4, 0 kg of the value of ideal body mass calculated according to Lorenz. If we accept this as true, body mass of our walker should read 70, 5 kg. Values of body mass index ranging from 19-24,9kg/m² encompass persons of normally nutrition state. According to average values walkers have these values which are closer to the lower limit of the normally nutrition persons. This is understandable because we talk here about athletes whose discipline calls upon smaller body mass. Values of the Kettle's weight-height index in walkers are closer to the values of this index in marathon runners (350gr/cm), in sprinters this index is 401 gr/cm), and in shot put throwers is 613 gr/cm.

References

- Đurašković, R. (2002). *Sportska medicina*. Niš : S.I.I.C.
Gerver, W.J.M. & De Bruin, R.(1996). *Pediatric Morphometric*. Utreht, The Netherlands: Wetenschappelijke uitgeverij Bunge.
Medved, R. (1987). *Sportska medicina*. Zagreb: JUMENA.
Tumanjan, G.S. & Martirosov, E.G.(1980). *Telosloženje i sport*. Sofija: Medicina i fizkultura.
www.iaaf.org.

RELACIJE VISINE I TEŽINE KAO ZNAČAJAN FAKTOR USPJEHA U BRZOM HODANJU

Sažetak

Brzo hodanje je sportska disciplina koja od sportaša zahtijeva posjedovanje određenih morfoloških značajki koje odstupaju od uobičajeno praćenih svojstava u trenažnim sesijama kako bi se osigurali uslovi za postizanje vrhunskog rezultata. Srbija ima relativno mali broj sportaša koji prate takmičenja u brzom hodanju, tj. u sportu za koji se pretpostavlja da animira i privlači veći broj takmičara budući omogućava takmičenja ali isto tako i rekreativno bavljenje. Cilj ovog rada je da predstavi neke relacije visine i težine kod hodača koji su ostvarili vrhunski rezultat na svjetskom prvenstvu. Ovi rezultati mogu koristiti trenerima u sportu i sportskim stručnjacima u selekciji djece za hodanje. Bilo je uključeno 55 elitnih hodača. Dobiveni rezultati ukazuju na to da je prosječna visina 176.51 +/- 5.52 cm, a tjelesna masa 64.85 +/- 5.02 kg. U skladu sa prosječnom vrijednošću BMI (body mass index) od 20.80 +/- 1.07 kg/m², hodači pripadaju skupini koja je na donjoj granici "normalnih" osoba. Ovi sportaši imaju prosječno manju masu od 5 kg u poređenju sa "idealnom" masom izračunatom po Lorenzovoj formuli.

Ključne riječi: brzo hodanje, visina, težina, masa tijela

Received: August, 27. 2008.

Accepted: December, 10. 2008.

Correspondence to:

Aleksandar Raković, MSc.

University of Niš

Faculty of Sport and Physical Education

Čarnojevića 10A, 18000 Niš, Serbia

Phone: +381(0)18 510 900

E-mail: info@ffk.ni.ac.yu