

Original Article

**Comparative study on the evolution of the top three speed skaters ranked at the 5000m competition at the World Single Distances Championships 2017 reported to the world records in force**

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**Abstract:** *Purpose:* This study wants to highlight the results obtained at the 5000m task of the top three ice-skaters at the World Single Distances Championship 2017 skating competition and their comparison with the world record in force. In speed skating, there are different factors that influence the top level results, such as: ice quality, training level, material quality, anthropometrics, physiological features, the lactate accumulation in blood during the competition, specific techniques and not last the biomechanical aspects that have a significant influence on the energy transmitted to the muscles. *Materials and methods:* The methods used in this experiment are: documentation method, statistical method, comparing method and graphical and table method.

*Results:* By comparing the results of the top three at the 2017 World Championship at the 5000m competition with the world record, we can see that at the boys' section, the top 8 results obtained have values under 28.6 seconds compared to the 3 results obtained this year where the values are fewer, the 2nd and the 3rd place being practically earned only on the first lap, compared to S. Kramer, which has 4 rounds below 29 seconds. Keeping the same idea, in the girls' section it is noticed that at the world record 7 tours take less than 32 seconds compared to the 3 results from 2017 where it is noticed that there is no intermediate time under 32 seconds.

**Conclusions:** In the 5000m competition, the development and maintenance of a high average speed throughout the race is one of the main items leading to world success, this item having "behind" a multitude of items, some of which are mentioned above.

**Key words:** study, comparison, speed skating, world record

**Introduction**

Speed skating is a sport that is gaining more and more success in countries with a less developed tradition. Being an individual sport, the quality of the training and the technique of a professional athlete leads to success, as it generally depends on the average speed a skater develops and can maintain for a chosen distance. The emergence of success depends on several factors that remind some such as anthropometrics, physiological training, lactation level in blood, technique, etc. As it is known, the energy underlying muscle contraction originates has its origin in a chemical substance called adenosine triphosphate (ATP), which produces the energy needed for muscle contraction.

This study aims to highlight the results obtained at the 5000m task of the top three ice-skaters at the World Single Distances Championship 2017 speed skating competition and their comparison with the world record in force. Getting the best performance in high-performance sports is a challenge because the current level of results is very high, training gaining a superior valence. R Manno (1996, p. 26) considers that training is a "complex process of intervention, the purpose of which is to learn and perfect the technique, in a simple or chained form, for an individual, group or team, which aims the developmnet of the physical-psyhic qualities, allowing for maximum performance, taking into account the potential of the subject, group or team. "

In skating speed, as with other sports, training at the level of athletes has a high degree of specificity, especially due to the morpho-functional specialization of the body, based on the specific characteristics of the competitive effort in speed skating competitions. In the profesional training of the athletes the effort-fatigue relationship is one of the main factors of progress, an important role playing the need to change the training stimulus periodically. There is also a lot of discussion about the aerobic and anaerobic energy system, the specialists in the field discovering that training with high-intensity intervals , which is an anaerobic training type, it is possible to improve the aerobic energy system, between these two systems being well-established links.

**Materials and methods**

This study wants to highlight the current level of top speed skaters as compared to the world records at the 5000m competition at both girls and boys sections, without questioning other features of this sport because this subject is vast and does not fit into this work.

The methods used in this experiment are: documentation method, statistical method, comparing method and graphical and table method. The world record for the 5000m skating speed competition for boys was obtained by Sven Kramer on 17 Nov 2007 in Calgary with a time of 6: 03.32, and for the girls it was obtained by M. Sáblíková at the Salt Lake City on 18 February 2011 with the time of 6: 42.66.

**Results**

The study I propose targets the ranked top 3, both in girls and boys sections, based on the results obtained by them at the 5000m task, which are completed by the intermediate times of the competition. To better highlight these results, the data is shown in the graphs and tables below. Table 1 shows the world records for boys and girls with the times at each round and intermediate times.

*Table 1. World records at the 5000 m boys / girls*

<i>Distance</i>	<i>Boys</i>		<i>Girls</i>	
	<i>S. Kramer</i>	<i>S. Kramer</i>	<i>M. Sáblíková</i>	<i>M. Sáblíková</i>
	<i>Time</i>	<i>Lap</i>	<i>Time</i>	<i>Lap</i>
<b>200m</b>	17.74	17.7	20.29	20.2
<b>600m</b>	45.88	28.1	51.39	31.1
<b>1000m</b>	1:14.40	28.5	1:22.83	31.4
<b>1400m</b>	1:42.98	28.5	1:54.30	31.4
<b>1800m</b>	2:11.33	28.3	2:25.90	31.6
<b>2200m</b>	2:39.98	28.6	2:57.53	31.6
<b>2600m</b>	3:08.59	28.6	3:29.37	31.8
<b>3000m</b>	3:37.15	28.5	4:01.54	32.1
<b>3400m</b>	4:05.73	28.5	4:33.55	32.0
<b>3800m</b>	4:34.92	29.1	5:05.45	31.9
<b>4200m</b>	5:04.20	29.2	5:37.66	32.2
<b>4600m</b>	5:33.77	29.5	6:09.87	32.2
<b>5000m</b>	6:03.32	29.5	6:42.66	32.7

Table 2 shows both the results obtained by the top 10 at ISU World Uniform Distances Championships 2017, as well as the difference in seconds, with the total difference between the first and the last competitor being 12.05 seconds and between the first and the second competitor being 2.51 sec.

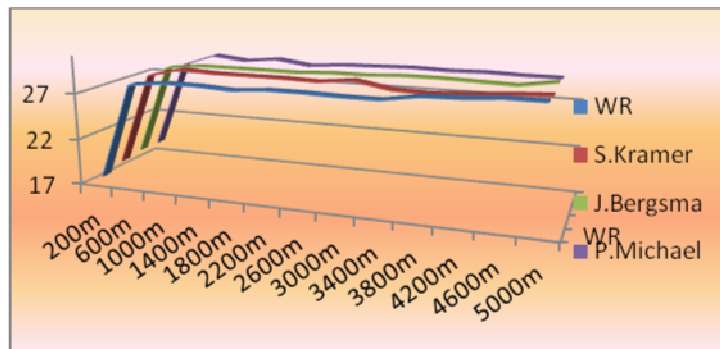
*Table 2. Times achieved by the top 10 athletes (Boys)*

Rank	Name	Nation	Time	Behind
<b>1</b>	Sven Kramer	NED	6:06.82	
<b>2</b>	Jorrit Bergsma	NED	6:09.33	2.51
<b>3</b>	Peter Michael	NZL	6:11.67	4.85
<b>4</b>	Douwe de Vries	NED	6:13.70	6.88
<b>5</b>	Ted-Jan Bloemen	CAN	6:14.73	7.91
<b>6</b>	Sverre Lunde Pedersen	NOR	6:15.77	8.95
<b>7</b>	Patrick Beckert	GER	6:16.52	9.70
<b>8</b>	Jordan Belchos	CAN	6:16.92	10.10
<b>9</b>	Bart Swings	BEL	6:17.20	10.38
<b>10</b>	Alexis Contin	FRA	6:18.87	12.05

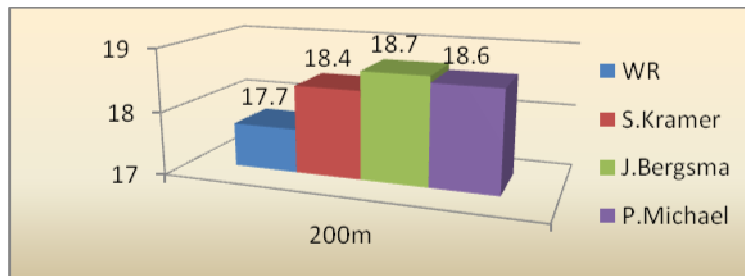
*Table 3. Times at each round and intermediate times achieved by the top 3 athletes*

<i>Distance</i>	<i>Boys</i>		<i>S. Kramer</i>		<i>J. Bergsma</i>		<i>P. Michael</i>	
	<i>Time</i>	<i>Lap</i>	<i>Time</i>	<i>Lap</i>	<i>Time</i>	<i>Lap</i>	<i>Time</i>	<i>Lap</i>
<b>200m</b>	18.40	18.4	18.73	18.7	18.63	18.6		
<b>600m</b>	46.80	28.4	47.38	28.6	46.98	28.3		
<b>1000m</b>	1:16.11	29.3	1:16.46	29.0	1:16.66	29.6		
<b>1400m</b>	1:45.30	29.1	1:45.47	29.0	1:45.90	29.2		
<b>1800m</b>	2:14.41	29.1	2:14.55	29.0	2:15.58	29.6		
<b>2200m</b>	2:43.56	29.1	2:43.58	29.0	2:44.75	29.1		
<b>2600m</b>	3:12.64	29.0	3:12.78	29.2	3:14.20	29.4		
<b>3000m</b>	3:42.04	29.4	3:42.03	29.2	3:43.73	29.5		
<b>3400m</b>	4:10.83	28.7	4:11.47	29.4	4:13.34	29.6		
<b>3800m</b>	4:39.43	28.6	4:40.88	29.4	4:42.90	29.5		
<b>4200m</b>	5:08.30	28.8	5:10.27	29.3	5:12.59	29.6		
<b>4600m</b>	5:37.45	29.1	5:39.53	29.2	5:42.09	29.5		
<b>5000m</b>	6:06.82	29.3	6:09.33	29.8	6:11.67	29.5		

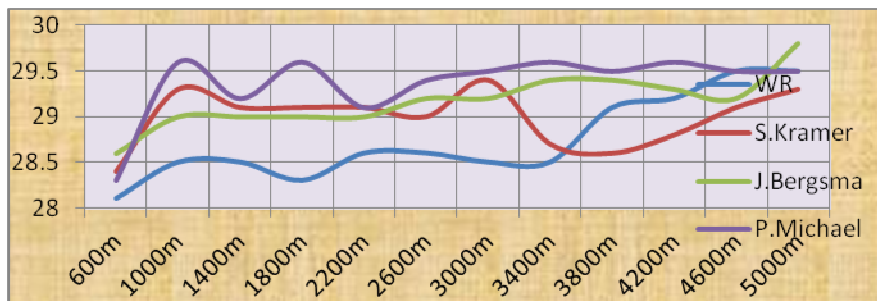
The data in table 3 and in charts 1-3 give us complete data on the evolution of the first 3 ISU World Uniform Distances Championships 2017 highlighting not only the final time they get, but also the intermediate times in order to get us a correct opinion on their evolution along the 5000m competition. From the above can be seen the variation of the times obtained on each round made by the athletes compared to the best time obtained, namely the world record in force.



**Chart 1.** The evolution of the top three athletes compared to the world record (boys)



**Chart 2.** The evolution of the first 3 athletes on the first 200m versus the world record



**Chart 3.** Evolution of the results obtained on each round of the first 3 athletes on a distance of 600m-5000m compared to the world record

The tables and graphs below are dedicated to the results obtained by the girls at the above-mentioned championship as well as to the evolution of the first three athletes compared to the best result.

**Table 4.** Times made by the top 10 girls (girls)

Rank	Name	Nation	Time	Behind
1	Martina Sáblíková	CZE	6:52.38	
2	Claudia Pechstein	GER	6:53.93	1.55
3	Ivanie Blondin	CAN	6:57.14	4.76
4	Anna Yurakova	RUS	6:57.27	4.89
5	Antoinette de Jong	NED	6:59.33	6.95
6	Isabelle Weidemann	CAN	6:59.75	7.37
7	Carien Kleibeuker	NED	6:59.79	7.41
8	Bente Kraus	GER	7:00.62	8.24
9	Natalia Voronina	RUS	7:02.94	10.56
10	Marina Zueva	BLR	7:03.40	11.02



