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Original Article

Time ratio of the triathlon race segments in the olympic and sprint distances in competitors of different performance levels

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Abstract:
The aim of this study was to determine the percentage of swimming, cycling and running in the total time of Olympic and sprint distance triathlon races, and to check whether there are significant differences in these parameters between competitors of different performance levels. The results of the Serbian Olympic distance triathlon championship (N=369) and sprint distance triathlon championship (N=479) in the period of 2011-2020, were used to determine the differences in the percentage of race segments (swimming, cycling including both transitions and running). The analyze was performed in relation to the total duration of the race, between the participants who were placed in different quartiles according to the overall positions (Q1 – the best competitors, placed in the first quarter, Q2, Q3 и Q4 – competitors placed in the last quarter). The results indicate that the percentage of segments differ among the triathletes of different performance levels in the both distances. In the Olympic distance, competitors who were placed in the first quarter of the race differed significantly from the other three groups of the less successful competitors: the percentage of the swimming segment in the total race time in this group was significantly lower, and the percentage of the cycling segment was significantly higher than in other groups. There were no significant differences between the other groups of competitors. In the sprint distance race, the best-placed competitors (Q1) differed significantly from the less successful competitors: the share of the swimming segment in Q1 was significantly lower, and the share of the cycling segment was significantly higher than in other groups. The lowest-ranked competitors (Q4) were significantly different from all the others: swimming segment in Q4 was significantly longer, and the share of the cycling segment was significantly shorter than in the other groups. A comparison of the segments in the Olympic and sprint distances showed that there were significant differences: the share of the swimming and running segments was higher, and the share of the cycling segment (with transitions) was smaller in the Olympic than in the sprint distance.
Key words: Competition, Swimming, Running, Cycling, Aerobic Endurance, Training

Introduction

Triathlon is an endurance sport that consists of swimming, cycling and running, Due to the increase in motivation and the possibility for recreational athletes to try out many activities, triathlon is advancing unstoppably and enjoys increasing popularity among competitors and recreational athletes of all ages of both genders. Since 1980, triathlon has been one of the fastest-growing recreational sports in the United States. According to the USA Triathlon organization, the number of registered triathletes exceeded 100,000 in 2007, and 200,000-250,000 people compete each year only in the United States (Mora, 2009). The largest number of participants is involved in a sprint distance triathlon and an Olympic distance triathlon. It can be assumed that the increasing trend regarding a number of competitors and participants in these races, both in the world and in our country, will continue to grow in the years to come (Martínez & Carracedo Garnateo, 2018)

The Olympic triathlon distances include as follows: 1.5-kilometer swim, 40-kilometer cycle, 10-kilometer run. The triathlon race segments in the Olympic distance triathlon are different in duration: swimming is of the shortest duration - 16.2%, cycling with transitions is of the longest duration - 54.3%, and the duration of running is 29.5% (Cejuela et al., 2013). The format of a sprint distance triathlon is similar since each of the segments is half the distance exactly. In our research, it was assumed that the percentage of time spent in the triathlon race segments in relation to the total time of the race in the Olympic and sprint distance triathlons will differ significantly when triathletes of different competitive performances are compared. Specifically, the assumption was that the time percentage of swimming and running segments is lower, and the time percentage of the segment of cycling (with transitions) is higher among triathletes that are more successful. This assumption was because a group ride ('draft') is allowed at the Olympic and sprint distances competitions. Group riding in races often leads to a situation where weaker competitors spend most of their time 'drafting' behind better riders, so better riders cannot make a big difference in the cycling segment, as in the situations where group riding is prohibited in races. One of the first studies on this topic was conducted by Stojiljković and Marić (1996). The

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authors analyzed the results achieved at the first four championships of Yugoslavia (1993-1996) held over the Olympic distance and found that in 20 first-placed competitors. The degree of correlation between segments and result in the race, from year to year, varied in the range of r = 0.43-0.68 for the swimming segment, r = 0.62-0.84 for the cycling segment and r = 0.19-0.79 for the running segment. When analyzing the cumulative results of all 4 championships, the swimming segment strongly correlated with the overall result (r = 0.81), as well as the cycling segment (r = 0.80), while the running segment correlated less with the overall result in the race (r = 0.47). These data are quite different from the results of later research, especially in relation to the correlation between the swimming segment and the result of the race, which was generally not determined to be so high in later studies. The most probable reason is that the results in triathlon have significantly improved over time, as well as the fact that the sample of respondents in the available recent research consisted of better competitors. It should also be mentioned that at that time (1993-1996), group riding was not allowed in the cycling segment of the race in the analyzed competitions.

Athlete training and athlete monitoring programs work in combination and typically incorporate training loads, health and well-being as well as different approach to recovery strategies (Etxebarria, Mujika & Pyne, 2019). While different training and periodization variables as well as pacing strategies are highly researched (Knechtle et al. 2015a; Lepers, 2019; Etxebarria et al., 2021; Etxebarria, Mujika & Pyne, 2019), there is a lack of studies that analyzed the relationship between results in individual segments of the race and the final race result. In triathlon as well as other endurance sports such as cross triathlon, the development of aerobic endurance is essential it represents 60-85% of the total training volume (Liparova & Brodani, 2015). Recent studies showed that high training volumes are highly predictive for overall race time (Knechtle et al., 2015b). Previous studies also showed that from physiological point, there is very high correlation between times for 800 m swim achieved in the modified test and endurance ability important for swimming in triathlon (Seidl, Pupiš & Suchy, 2015). Still, beside pure physiological and training parameters, it is also important to determine how different race segments affects the final results of the race. Research in this field on the iron man 70.3 race, showed that more successful competitors significantly differ according to the relative duration of the triathlon race segments (Strelić, Ranisavljev & Stojiljković, 2021)

Therefore, the aim of the present paper was to analyze the extent to which the results in the triathlon race segments affect the overall result in the Olympic and sprint distances in competitors of different performance levels. Based on the obtained results, it will be possible to give recommendations for the adjustment of training components (primarily frequency and volume), in order to achieve better results in the race.

Material & methods

Participants & procedures

The official results of the races organized by the Serbian Triathlon Union were used as a database for this research (https://www.triatlon.org.rs/rezultati/). The results of all competitors who successfully completed the race of the Serbian championship in the Olympic (N = 369) and sprint distance (N = 479), in the 2011-2020 period, were analyzed. This period was selected because the results achieved in the race segments have been available since 2011. The data used in the research included: the result achieved in each of the three race segments (swimming; cycling with both transitions; running), the final result and the placing in the race. The times of both transitions were added to the cycling segment since such a measuring method was used at the national championships in the specified period (only in the last few years the time spent in both transitions has been measured separately so that the sample would be much smaller in case of such an analysis).

At each national championship in the Olympic and sprint distances in the 2011-2020 period, the competitors were divided into four qualitative groups - 4 quartiles, according to the placing at the end of the race: Q1 - the fastest, Q2, Q3, and Q4 - the slowest ones. The descriptive parameters of the percentage share of the segments in the overall result of the race were calculated for each quartile, and then these values were compared between the quartiles i.e., between the participants of different competitive performances, in the Olympic and sprint distances separately. Finally, a comparison was made between the results achieved in the Olympic and sprint distances.

Statistical analysis

The results were processed using descriptive and comparative statistical analyses. The basic descriptive parameters (arithmetic mean) and variance parameters (standard deviation) were calculated. In the field of comparative statistics, in order to determine a statistical significance of the differences between 4 quartiles of competitors of different performance levels, the analysis of variance with one modality factor (Single Factor ANOVA – Post hoc Tukey HSD) was used. To determine the significance of the difference between the competitors in the Olympic and sprint distances, a t-test for independent samples (t-test: Two-Sample) was used. For all the comparisons, statistical significance was set at the level of $p < 0.05$, and data processing was performed using the SPSS 21.0 software (SPSS Inc, Chicago, IL, USA) and Office Excel 2010 (Microsoft Corporation, Redmond, WA, USA).

Results

The results at the Serbian Championships in the Olympic and sprint distance triathlons in the 2011-2020 period, in total and by quartiles, are shown in Table 1. The average result at the Olympic distance (N = 369), was about 2 hours and 46 minutes, in a wide range from 2:19:01 at Q1, to 3:17:33 at Q4 (the difference between Q1 and Q4 was expected to be large - about 58 minutes). The average result in the sprint distance triathlon (N = 479) was about 1 hour and 18 minutes, in a wide range from 1:05:27 in Q1, to 1:32:43 in Q4, (the difference between Q1 and Q4 was also expected to be large - about 27 minutes).

Table 1. Results at the Serbian Championships in the Olympic and sprint distance triathlons in the 2011-2020 period, in total and by quartiles.

	Olympic distance			**Sprint distance**		
	N	AM (*h:min:sec*)	SD (*min*)	N	AM (*h:min:sec*)	SD (*min*)
Q1	95	**2:19:01**	11,56	122	**1:05:27**	3,92
Q2	93	**2:37:44**	11,32	121	**1:13:35**	2,91
Q3	94	**2:52:33**	14,77	120	**1:20:33**	4,02
Q4	87	**3:17:33**	21,19	116	**1:32:43**	8,93
Total	369	**2:46:05**	26,03	479	**1:17:54**	11,34

Legend: Q1-Q4 - quartiles; N - number of participants; AM - arithmetic mean; SD - standard deviation

Tables 2 and 3 show the percentage of time of individual segments in relation to the final result of the race at the Olympic and sprint distances, presented by quartiles and on the total sample of all participants. On the total sample, at both distances, it can be seen that the segment of cycling with transitions accounted for about a half of the race duration, while swimming and running accounted for about 20% and 30% of the race time respectively. The results have shown that there are certain differences between the competitors of different performance levels. The most successful competitors spent a little more time on the segment of cycling with transitions and a little less time was spent on swimming and running, in comparison to the lower-ranked competitors.

Table 2. The percentage of time of individual segments in relation to the final result of the race at the Olympic triathlon distance presented by quartiles and on the total sample of all participants in the 2011-2020 period

		Swimming		Cycling (with T1 & T2)		Running	
	N	AM (%)	SD	AM (%)	SD	AM (%)	SD
Q1	95	**18,31**	2,06	**50,46**	3,39	**31,22**	2,36
Q2	93	**20,09**	2,56	**48,59**	3,54	**31,31**	3,27
Q3	94	**19,75**	2,74	**48,51**	4,26	**31,74**	3,69
Q4	87	**20,02**	3,78	**47,43**	4,55	**32,55**	3,97
Total	369	**19,53**	2,91	**48,78**	4,08	**31,69**	3,39

Legend: Q1-Q4 - quartiles; N - number of participants; AM - arithmetic mean; SD - standard deviation

Table 3. The percentage of time of individual segments in relation to the result of the race at the sprint triathlon distance presented by quartiles and on the total sample of all participants in the 2011-2020 period

		Swimming		Cycling (with T1 & T2)		Running	
	N	AM (%)	SD	AM (%)	SD	AM (%)	SD
Q1	122	**16,98**	2,32	**53,70**	2,38	**29,31**	2,79
Q2	121	**18,37**	3,20	**51,74**	2,27	**29,91**	3,41
Q3	120	**18,21**	3,35	**52,05**	3,14	**29,75**	3,49
Q4	116	**19,51**	4,37	**50,74**	3,65	**29,69**	3,68
Total	479	**18,25**	3,48	**52,08**	3,09	**29,66**	3,35

In the Olympic distance, the best competitors (Q1) differed significantly from the other three groups of less successful competitors: the share of the swimming segment in the total race time in this group was significantly lower, and the share of the cycling segment (together with transitions) was significantly higher than in other groups. Running segment was significantly lower only in relation to the fourth group (Q4 - the lowest-ranked competitors). There were no statistically significant differences between the other groups of the competitors. The results in the Olympic distance triathlon in the period from 2011 to 2020 are shown in Table 4.

Table 4. The summary results of the comparison of the race segments between the competitors of different performance levels in the Olympic distance triathlon at the Serbian Championships in the period from 2011 to 2020

		Swimming		Cycling (with T1 & T2)		Running	
quartiles	quartiles	*Mean Difference*	*Sig.*	*Mean Difference*	*Sig.*	*Mean Difference*	*Sig.*
Q1	Q2	-1,785	**0,000*****	1,870	**0,007****	-0,087	0,998
	Q3	-1,441	**0,003****	1,956	**0,004****	-0,518	0,714
	Q4	-1,707	**0,000*****	3,033	**0,000*****	-1,329	**0,040***
Q2	Q3	0,344	0,840	0,086	0,999	-0,431	0,817
	Q4	0,077	0,998	1,164	0,200	-1,242	0,065
Q3	Q4	-0,267	0,922	1,078	0,259	-0,811	0,368

Legend: *Mean Difference* - difference between quartiles; (* p<0,05; ** p<0,01; *** p<0,001)

The percentage of the swimming segment time in the overall result of the race in the Olympic distance differed quite significantly between the respondents of different levels of performance ($F_{(3;\ 365)} = 8.149$; $p < 0.001$). The multiple quartiles comparison (Post hoc Tukey HSD) showed a statistically significant difference existing between Q1 and all other quartiles, while the other quartiles did not differ from each other. The percentage of the cycling segment time (with transitions) in the total result of the race in the Olympic distance differed quite significantly between the respondents of different levels of performance ($F_{(3;\ 365)} = 9{,}351$; $p < 0.001$). The multiple quartiles comparison (Post hoc Tukey HSD), essentially identical to swimming, showed that a statistically significant difference existed between Q1 and all other quartiles, while the other quartiles did not differ from each other.

The percentage of the running segment time in the total result of the race in the Olympic distance, significantly differed between the respondents of different levels of performance ($F_{(3;\ 365)} = 2{,}923$; $p < 0{,}05$). The multiple quartiles comparison (Post hoc Tukey HSD) showed that a statistically significant difference existed between Q1 and Q4, while the other quartiles did not differ from each other. In the sprint distance, the obtained results were similar to the results of the Olympic distance, but the differences between the quartiles were somewhat larger when observing the segments of swimming and cycling, and they were smaller and not significant when the segment of running was examined. Group 1 (Q1 - the best-ranked competitors), differed significantly from the other three groups of less successful competitors: the share of the swimming segment in the total race time in this group was statistically significantly lower, and the share of the cycling segment (together with transitions) was statistically significantly higher than in other groups. Group 4 (Q4 - the lowest-ranked ones) also differed significantly from all other groups: the share of the swimming segment in the total race time in this group was statistically significantly higher, and the share of the cycling segment (together with transitions) was statistically significantly lower than in other groups. Regarding the share of the running segment in the total race time, there were no significant differences between the groups. Between the two groups of the competitors placed in the middle (Q2 and Q3), there was no significant difference in either segment of the race.

For the sake of clarity, the summary results of the comparison of the race segments in the sprint distance triathlon between competitors of different performance levels, at the Serbian Championships in the period from 2011-2020, are shown in Table 5.

Table 5. The summary results of the comparison of the race segments between the competitors of different performance levels in the sprint distance triathlon at the Serbian Championships in the period from 2011 to 2020

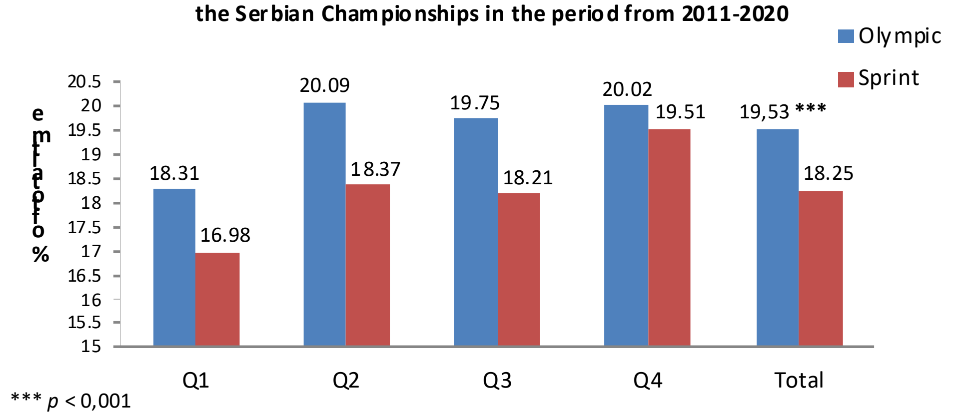
		Swimming		Cycling (with T1 & T2)		Running	
quartiles	quartiles	*Mean Difference*	*Sig.*	*Mean Difference*	*Sig.*	*Mean Difference*	*Sig.*
Q1	Q2	-1,388	**0,008****	1,961	**0,000*****	-0,594	0,513
	Q3	-1,230	**0,025***	1,652	**0,000*****	-0,433	0,747
	Q4	-2,531	**0,000*****	2,960	**0,000*****	-0,379	0,820
Q2	Q3	0,158	0,984	-0,309	0,843	0,161	0,982
	Q4	-1,143	**0,047***	0,999	**0,041***	0,215	0,960
Q3	Q4	-1,300	**0,017***	1,308	**0,003****	0,054	0,999

Legend: *Mean Difference* - difference between quartiles (* p<0,05; ** p<0,01; *** p<0,001)

The comparison of the percentage of the swimming segment time in the total result of the sprint distance race, between the triathletes of different competitive performance levels, showed that the share of the swimming segment differed quite significantly between the respondents of different performance levels ($F_{(3; 475)}$ = 11,205; p <0.001). The multiple quartiles comparison (Post hoc Tukey HSD), showed that a statistically significant difference existed between all the pairs of quartiles, except between Q2 and Q3.

The comparison of the percentage of the cycling segment time (with transitions) in the total result of the sprint distance race, between the triathletes of different competitive performance levels, showed that the share of the cycling segment differed quite significantly between the respondents of different performance levels ($F_{(3; 475)}$ = 21,412; p <0.001). For the sake of clarity, the summary of the comparison between the competitors in the Olympic and sprint distance triathlons, at the Serbian Championships in the period from 2011-2020, are shown in Figure 1.

Figure 1. The summary results of the comparison of the race segments between the competitors in the Olympic and sprint distance triathlons, at the Serbian Championships in the period from 2011-2020



It can be seen that swimming segment was higher in the triathletes competing in the Olympic distance than in the competitors in the sprint distance, in all quartiles and in the total sample (19.53% vs. 18.25%, respectively). The t-test for independent samples showed that the difference was statistically significant ($t_{(840,153)}$ = 5,807; p <0.001). The cycling segment was lower in the triathletes competing in the Olympic distance than among the competitors in the sprint distance, in all quartiles and in the total sample (48.78% vs. 52.08%, respectively). The T-test for independent samples showed that the difference was significant ($t_{(664,257)}$ = 12,921; p <0.001). It can be seen that the portion of the running segment was higher in the triathletes competing in the Olympic distance than in the competitors in the sprint distance, in all quartiles and in the total sample (31.69% vs. 29.66%, respectively), and the t-test for independent samples showed that the difference was significant ($t_{(846)}$ = 8.674; p <0.001).

The comparison of the percentage of segments in the Olympic and sprint distances showed that there were statistically significant differences: the portions of the swimming and running segments were higher, and the portion of the cycling segment (with transitions) was lower in the Olympic distance than in the sprint distance.

Discussion

Among the most successful competitors in the Olympic distance in Serbia (Q1), the time distribution by segments was: swimming - 18.31%; cycling with transitions - 50.46%; running - 31.22%. This distribution was statistically significantly different in relation to the less successful competitors. The portion of the swimming segment in the total race time in the group of the best competitors was lower, and the portion of the cycling segment (together with transitions) was higher than in other groups; while the share of the running segment was significantly lower only in relation to the group of the lowest-ranked competitors.

Based on the results of the research, it can be concluded that the lower-ranked competitors lagged behind the best ones mostly in the swimming segment. Possible reasons may be the following: insufficient frequency, volume, and intensity of swimming in the less successful competitors, as well as their poorer technique and lower efficiency of swimming in open waters. Therefore, lower-ranked competitors can be advised to focus their attention in training primarily on improving swimming results.

The best triathletes from Serbia (Q1) had a relatively similar time distribution by segments, as the participants in 20 international triathlon races of the World Cup in the Olympic distance, organized by the ITU (International Triathlon Union), held during the 1997 season (N = 1084): swimming - 18%; cycling with transitions - 52%; running - 30% (Landers et al., 2000). The difference is bigger when the average time distribution of all triathletes from Serbia is compared with the results of the aforementioned research.

However, the results of Serbian triathletes are quite different from the results of elite male triathletes, participants in 6 world championships and 3 competitions at the Olympic Games. In the period from 2000 to

2008 (N = 537), the segments of swimming, cycling with transitions and running were 16.2%, 54.3%, and 29.5% respectively (Cejuela et al., 2013). Triathletes from Serbia, even the best ones, spend significantly more time in the segments of swimming and running, and much less time is spent in the segment of cycling with transitions, compared to the world's elite triathletes. It can be assumed that this difference stems primarily from the samples of different quality: the best triathletes from Serbia, however, are not close to the world-class.

The result in the swimming segment showed a relatively weak correlation with the final placing at the end of the race, when group cycling was allowed in the cycling segment, in several available studies. In the study that analyzed 20 international ITU races, the correlation of the swimming segment with the overall result in the race was r = 0.49, which is practically the borderline between a relatively weak and a medium-strong correlation (Landers, 2008). However, in the already mentioned recent research, the correlation of results in the swimming segment with the final placing at the end of the race was relatively weak: r = 0.36 among elite triathletes at the Olympic Games and World Championships (Cejuela et al., 2013).

A relatively weak correlation of the swimming segment with the final placing at the end of the race may be a consequence of an increase in the level of men's swimming performance in recent years. It seems that the differences between the competitors in this segment used to be greater and more important in the past than in the current competitions. It is very important for triathletes to be well-ranked at the end of the swimming segment so that they can form the first group in the cycling segment (Millet & Vleck, 2000). In addition, it is important to consider that if drafting is allowed in the cycling segment. It should be used to the maximum in order for the competitor to save as much energy as possible for the rest of the race (Millet et al., 2000). Specifically, the study (Hausswirth et al., 2001) showed that VO2max concentration (~ 14%), ventilation (~ 30.8%), heart rate (~ 7.5%) and blood lactate concentration decrease during draft riding at 20km at an average speed of 39.5km/h -1, compared to individual cycling, which results in an improvement by 4% in running during sprint triathlons (running speed; 17.8 vs. 17.1km/h −1).

The draft during the swimming segment allows the triathlete to achieve a faster time by swimming behind a better swimmer. Thus, he saves energy for the subsequent segments of cycling and running (Brisswalter et al., 2008). The draft has been shown to improve the efficiency of swimming in several ways: by reducing the forces acting on the drafting swimmer by 10-26% (Millet et al., 2000; Chollet et al., 2000); by reducing a blood lactate level by 31% and a level of subjective fatigue by 21% by reducing oxygen consumption by 5% -10% (Neumayr et al., 2004; Delextrat et al., 2005; Padilla et al., 2000; Schumacher et al., 2011; Hausswirth et al., 1999). Despite the fact that the correlations found in swimming were of a low and medium level, swimming is a key segment for the outcome of the race, as slower swimming does not allow competitors to be at the forefront of the race in the later stages of triathlon. Triathletes who are not part of the first group after the swimming segment can hardly get to the position to fight for the podium and win the competition.

In the Olympic and sprint races, the cycling segment lasts about the same as the swimming and racing segments together, and it is similar in other formats. Stojiljković and Marić (1996) analyzed the first four national championships in the Olympic distance and concluded that the overall result in triathlon was very significantly related to the result in cycling (r = 0.80). That is why it is necessary to devote the greatest amount of time to cycling at training sessions. This is partly achieved by training frequency, and partly by the higher average duration of individual training on a bicycle in relation to swimming and running training sessions (Stojiljković and Papić, 2019). The study (Cejuela et al., 2013) obtained a medium-high degree of correlation between the cycling segment and the final placing (r = 0.62). This result has reinforced the hypothesis about the importance of tactics during this segment of the race (Bentley et al., 2007).

Running is the segment that is crucial and most closely related to the overall performance in triathlon (Hue et al., 2002; Bentley et al., 2007). Stojiljković and Marić (1996) reported a lower correlation between the effect of the racing segment on the overall result in the triathlon race (r = 0.47). It can be assumed that this value was different because that study was conducted in the time when group ride was not allowed in cycling. Recent studies (Cejuela et al., 2013) have confirmed the importance of running with a high degree of correlation (r = 0.83).

The results of previous studies suggest that good swimmers who come out of the water in the leading group have a better chance of winning or placing in the top 10 (Landers et al., 2008). The fact that 90% of male and 70% of female winners came from the first group of swimmers coming out of the water and that approximately half of the triathletes who made up the first group finished in the top 10 speaks volumes about the importance of this segment. The same study has shown opposite correlation between cycling and the final placing. The cycling segment has been shown to have the least impact on the final placing compared to swimming and running in both male and female competitors. Other data confirm the importance of running in determining the final placing in triathlon. These results are contrary to the previous studies that have suggested that swimming is not important for determining the final placing (Knechtle et al., 2007) or that all three disciplines are of the same importance.

The analyzed results confirm that training programs and training periods (micro, meso, and macrocycles), as well as the most important training variables (primarily the volume on a daily, monthly and annual basis), should be adjusted to the percentage of the segments relative to the total race duration (swimming about 20%, cycling about 50% and running about 30%). Deviations from these values are necessary mostly for beginners, and most often in the percentage of the swimming training share, which should be higher than 20% (which is approximately the amount in the race), since the technical difficulty is at the highest and therefore the progress in the water environment is slowest. More hours dedicated to perfecting swimming techniques and getting used to the water environment will certainly contribute to better results of the race.

Conclusion

The most successful competitors in the Olympic distance triathlon at the Serbian championships differed significantly from the other three groups of less successful competitors. The swimming segment in the total race time was statistically significantly smaller in this group, and the cycling segment (together with transitions) was statistically significantly higher than in other groups, while the share of the running segment was statistically significantly lower only compared to the fourth group (lowest-ranked competitors). The obtained results show that our most successful competitors spend approximately the same amount of time as the elite competitors in foreign competitions in terms of the percentage of the race segments. However, these parameters in low-ranked competitors are quite different.

The general conclusion of this study is that the best-placed triathletes differ significantly from less successful competitors in the percentage of the swimming and cycling segment - the swimming segment lasts shorter in competitors that are more successful and the cycling segment is longer than among less successful competitors. Lower-ranked competitors can be advised to focus their attention primarily on improving their swimming results at training sessions.

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