

Original Article

**Value of technical trainings, their analysis and effects on the preparation process of world elite orienteering competitors**

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**Abstract**

**Problem Statement:** Orienteering is a sport demanding not only serious physical shape but also strong intellectual potential, concentration and self control. The competitors have to make quick decisions about the best possible routes along the course while running in an unknown terrain at high speed. The result in a race is often depends on a combination of all - physical, technical, psychological and tactical preparations. It is difficult to make the right choices when preparing the training program – how often should one work on his technical skills, specialize in the psychological aspects of the sport or improve their physical shape? Purpose of the study is to research the opinion of world elite orienteering competitors about analysis of the training process with the help of GPS systems, types of technical trainings and their optimal number needed to maintain and to improve technical skills. **Methods:** a detailed questionnaire about technical preparation was conducted with 25 orienteering competitors from the world elite. **Results:** Most of the surveyed competitors from world elite are between 20 and 30 aged. They rely more on technical training not on competitions to improve their technical skills level. 56% of the world elite in orienteering participate in “between three and seven competitions” on a monthly basis and 29.2% of the survived competitors are training “between three and seven times” on an average monthly basis. 28% of the survived competitors think that needs more than seven technical trainings of month to maintain their technical skills. 68% of the surveyed athletes say that their preparation is mostly towards the physical shape. Only 24% of the surveyed athletes say that they always use GPS device to analyze their performance on an orienteering training or race. **Discussion:** Surveyed elite orienteering competitors are categorical about their opinion that the physical shape is closely connected with the technical performance during a training or race in orienteering. The amount of technical training and competitions monthly is also very important. Analyzing the orienteering competitions is extremely important because it gives the weak and strong sides of the competitor’s performance and what the competitor should train on. It is important to use the result of the analysis when planning the next training schedule. **Conclusions:** Common is the opinion that between three and seven technical trainings by month are better to improve technical skills of orienteering competitors. These athletes do not think and rely on the races to maintain their technical capabilities. Relatively small group of the surveyed athletes think that one can improve his technical skills by participating in more orienteering races on monthly basis. The physical shape without any doubt is directly connected with the technical performance during an orienteering training or race according to all surveyed athletes. It is top priority in the training schemes of 68% of these orienteering competitors. All surveyed athletes are categorical that analyzing of the technical performance after a race or training is very important. Using GPS device for analysis according to them is necessary to develop as an orienteering competitor.

**Key words:** orienteering, technical skills, trainings, competitions, GPS analysis.

**Introduction**

Orienteering is a sport demanding high levels of physical trainings designed to improve endurance, speed, speed endurance, power etc. but the mental aspect of the competitor also has a major impact in the final result. The orienteering competitor has to perform mental tasks while running – he or she has to be very focused and able to read the map on the go. The ability to take quick and correct decisions about which route choices to take while running at high speed in an unknown terrain is also a very decisive factor for the result (Гърков, 2003). The rules of the International orienteering federation (IOF) valid from 1<sup>st</sup> of January 2018 state that “*Orienteering is a sport in which the competitors navigate independently through the terrain. Competitors must visit a number of control points marked on the ground in the shortest possible time aided only by map and compass. The course, defined by the location of the controls, is not revealed to competitors until they start.*” (IOF, 2018). A detailed map of the competition area is made before hand and the course setter has set appropriate courses of the different age groups. Those courses should be run in the fastest time possible. The

characteristics of the competition area push the competitors mentally and physically, and the winner is defined by the ability to choose the best route, execute it as best as possible while running as fast as possible in the competition terrain (Cych et al., 2011; Tsiligirides, 1984). The map gives detailed information about the terrain like relief, surface, vegetation, rocks and stones, water and man-made features. The control points are connected in a course that must be ran in the same order that is printed on the map (Гърков и кол., 2008). The age of the competitors racing in orienteering events range from under 10 to over 80 years (Bird et al., 1993). The sport of orienteering has its origins in the military but nowadays it features a variety of different disciplines ranging from the more traditional long and middle distance forest races to the more recently developed city sprints. With the use of electronic punching systems and GPS tracking, orienteering has become an easy to follow sport that is attractive to the audiences with real time broadcasting on TV and the internet (Juga, 2017).

The results in orienteering are closely connected with the physical, technical, tactical and mental preparations of the competitors. The charm of this sport is in the independent navigation through the terrain and the ability to find the control points from the course using different orienteering techniques (Сираков и кол., 2017).

In most sports, it is easy to determine the techniques needed to perform well and their details because of their biomechanical characteristic of the movement (Георгиев и кол., 1990). In orienteering processes like map reading, taking route choices, navigating by compass, distance measuring and all other activities connected with navigation during an orienteering course and finding the controls are part of the orienteering techniques.

Having that in mind technical preparation in orienteering is the process in which all of these orienteering techniques, also called technical skills, are being worked on and improved. This does not exclude the preparation of the runner for the specifics of running an orienteering course in uneven terrain off the trails. This means that in orienteering you can consider the technical preparation in both running technique and orienteering technique.

From what we have already said, it is clear that orienteering is a sport that demands not only physical qualities but also mental resilience and specific technical skills for working with map and compass. Creating such skills and habits needs prolonged and hard work, many technical trainings through the years when an orienteering runner is being shaped up.

In orienteering during the last 20 years, more and more technologies are being used to promote and organize the trainings and competitions. These also contribute to making deeper analysis of the movement of the competitors through the terrain, the decisions one is taking on the course and the final result. Introducing the GPS technologies in orienteering gives the possibility to follow the movement of the competitors in real time, which on the other hand increases the spectators' interest (Илиев, 2015; Juga, 2017). With the help of GPS systems, it is possible to determine the exact location of every competitor on the course (Шопов, 2009). The first ever World championships in orienteering with live GPS tracking is the one held in Finland in 2001 (Juga, 2017).

**Purpose** of the study is to research the opinion of world elite orienteering competitors about analysis of the training process with the help of GPS systems, types of technical trainings and their optimal number needed to maintain and to improve technical skills.

## Methods

To achieve the goal and realize the tasks of the study a survey method was used. Object of the study were 25 orienteering competitors from the world elite men and women. Eight of them were medalists from European or World championships in 2018. This gives us the confidence to make conclusions from the answers of the questionnaire which can outline the model for preparation of the elite orienteering competitor. The study was conducted during the competition season of 2018 mostly online but also on location at the European and World orienteering championships in Switzerland and Latvia respectively. The questionnaire is consisted of 16 main questions. The competitors have the possibility to have more than one answer on some of the questions so this suggests there might be results with more than 100% in total.

## Results and Discussion

First two questions in the inquiry are to specify the gender (fig. 1.) and age (fig. 2.) of the participants in the survey – world elite orienteering competitors.

Results on figures 1 and 2 shows that 64% are men and 36% are women. It is important to mention that very significant number of the surveyed competitors are between the age of 20 and 30 years old – 72% of all participants in the inquiry, 20% of them are above 30 and 8% are below 20.

The next two questions give us the knowledge about how many times the surveyed competitors are doing technical trainings and how often do they take part in orienteering competitions on average monthly basis. 41.7% of all are training with map more than seven times per month. In a study we did last year with Bulgarian orienteering competitors mostly from the national team we asked the same question and only 5% of the surveyed athletes said that they train with map more than seven times per month [5]. 29.2% of the world elite in orienteering are training between three and seven times on an average monthly basis. 16.7% answered that they

use technical trainings up to three times per month and 12.5% - from 0 to 1. To make the parallel connection once again with the best Bulgarian orienteering competitors 31.7% answered 0 to 1 times per month (fig. 3).

On the question, how many races they participate in on a monthly basis 56% of the world elite in orienteering answer with “between three and seven”. Exactly 40% of the runners participate in no more than three races and just 4% of the surveyed athletes took the answer above seven (fig. 4).

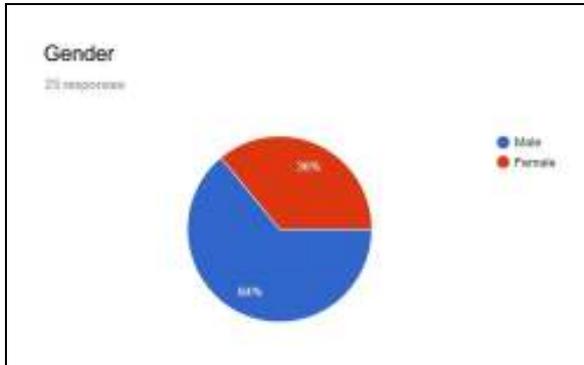


Fig. 1. Distribution of athletes by gender

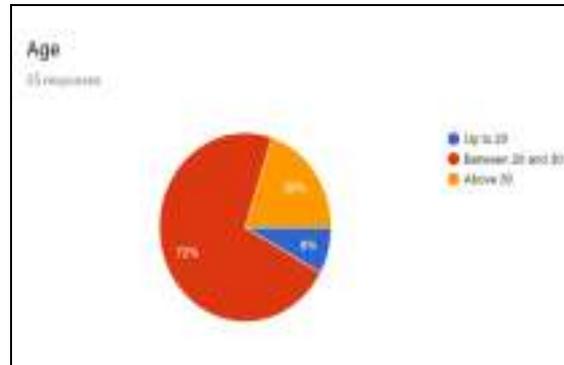


Fig. 2. Distribution of athletes by age

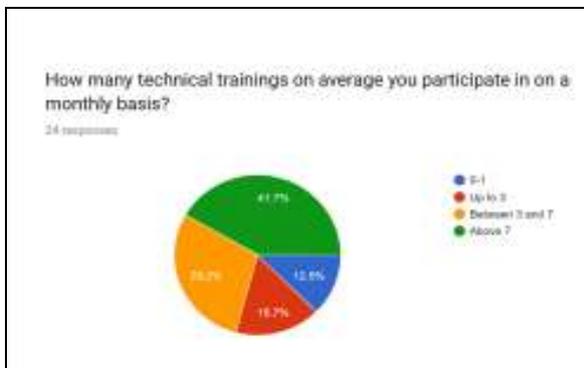


Fig. 3. How many technical trainings you have participated in on a monthly basis?

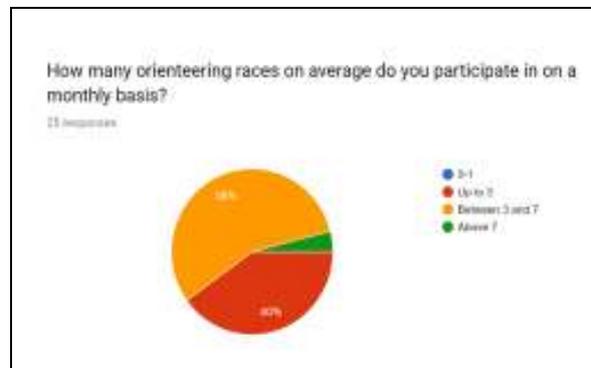


Fig. 4. How many orienteering races you have participated in on a monthly basis?

In the next two questions, we seek the opinion of the surveyed competitors about the optimal number of the technical trainings or participation in races on average monthly basis needed to maintain their technical skills. 40% say that between three and seven technical trainings are enough to maintain their shape. 28% of the survived competitors think that needs more than seven technical trainings of month. 24% of the surveyed athletes answer that up to three technical trainings are enough and 8% took 0 to 1 as their opinion (fig. 5).

Between three and seven is the most common answer among the surveyed competitors on how many races is optimal to maintain their technical skills – 56%. 32% say that up to three races per month are enough, 8% of competitors say that one needs more than seven races and 4% gives answer one or less (fig. 6).

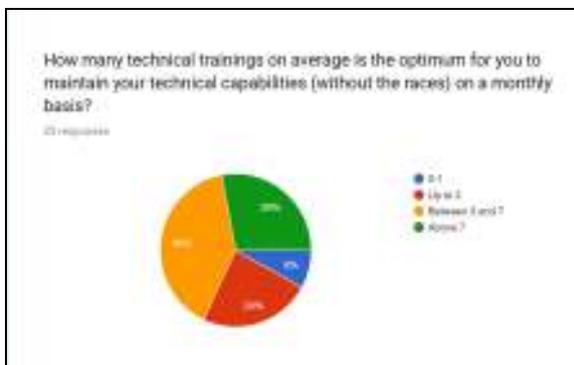


Fig. 5. How many technical trainings you need to maintain your technical capabilities on a monthly basis?

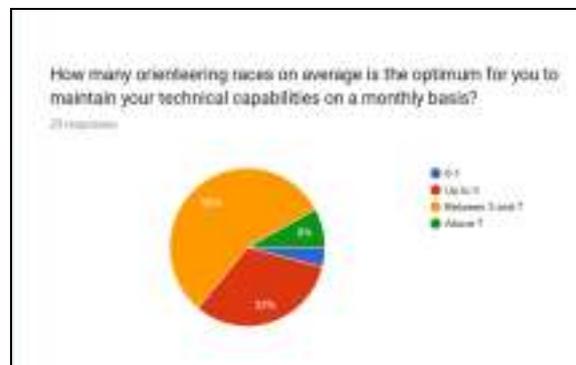


Fig. 6. How many orienteering races you need to maintain your technical capabilities on a monthly basis?

It is important to specify what the number of technical trainings on monthly basis is needed to increase your technical skills according to the surveyed competitors. 64% of the surveyed athletes think that more than

seven trainings per month are needed to improve the skills with map in hands. One can see that the world best orienteering competitors are trying hard to improve themselves and as we saw on one of the first questions in the inquiry 41.7% of them are doing more than seven trainings on a monthly basis. 28% think that three to seven technical trainings per month are enough to improve the capabilities of an orienteer. 8% consider that up to three trainings with a map can improve their technical skills (fig. 7).

60% of the surveyed athletes think that between three and seven races per month is the optimum to improve their technical skills. 20% consider that up to three races are enough to improve the shape. 16% voted for more than seven races on monthly basis to improve their technical skills (fig. 8).

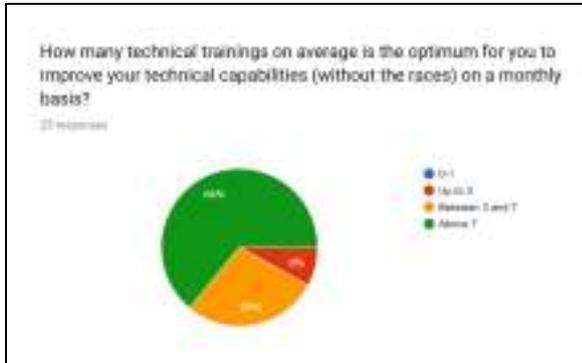


Fig. 7. How much technical trainings on average are the optimum for you to improve your technical capabilities on a monthly basis?

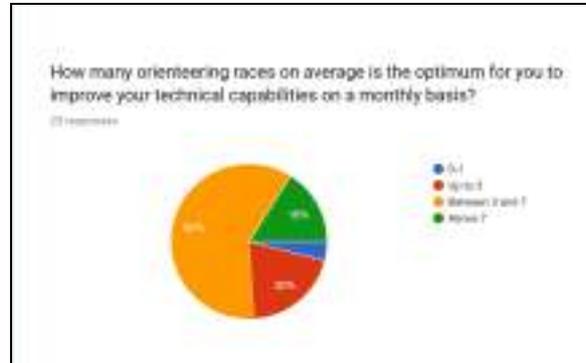


Fig. 8. How much orienteering races on average are the optimum for you to improve your technical capabilities on a monthly basis?

Surveyed elite orienteering competitors are categorical about their opinion that the physical shape is closely connected with the technical performance during a training or race in orienteering. All 100% think they are connected – 84% say “Yes, for sure” and 16% say “More like YES” (fig. 9).

In the next question, we ask what kind of technical trainings one should do. The most voted answer is “Different o-trainings” that got 52%. 48% got both “Regular orienteering courses” and “Depending on the season (specialized during the preparation season and regular o-courses during competition season)”. 44% votes got the “Specialized for every kind of technique” and the least – 36% went for “Multi-technique trainings to improve different o-techniques” (fig. 10).

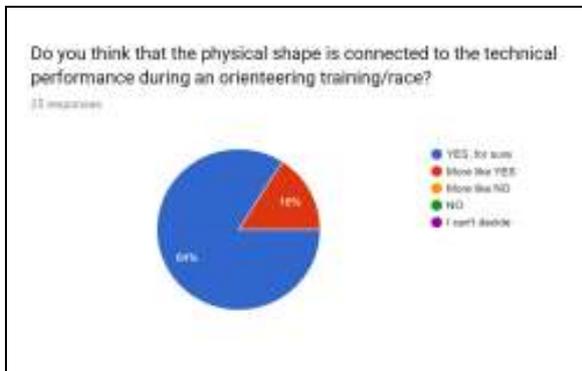


Fig. 9. Do you think that the physical shape is connected to the technical performance during an orienteering race/training?

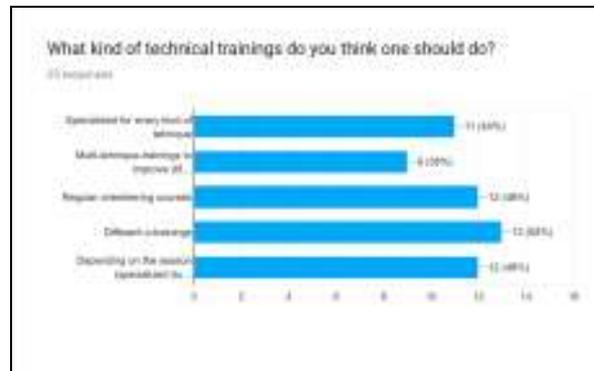


Fig. 10. What kind of technical trainings do you think the elite orienteering competitor should do?

68% of the surveyed athletes say that their preparation is mostly towards the physical shape. This actually confirms the fact that the running capabilities are extremely important for the results in orienteering. 36% say that they are trying to improve mostly their technical skills. Only 4% chose the mental skills as their target in preparation. 28% of the surveyed competitors said that they are primary working on all three – physical shape, technical skills and mental preparation (fig. 11.).

Analyzing the orienteering competitions is extremely important because it gives the weak and strong sides of the competitor’s performance and what the competitor should train on. That is why in the next question we ask the surveyed competitors how they analyze their performance after a race. 56% of the athletes draw their route on the maps, compare and study the split times between each leg of the course and 52% of them say they compare and study the split times only. 32% of the surveyed competitors answer that they lead a detailed discussion about route choices, times and performance (fig. 12.).

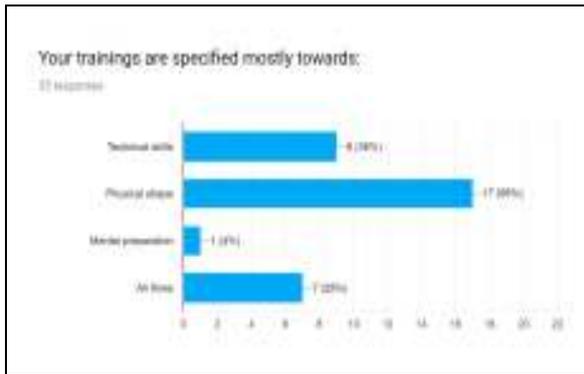


Fig. 11. What is the priority of the preparation of the surveyed athletes?

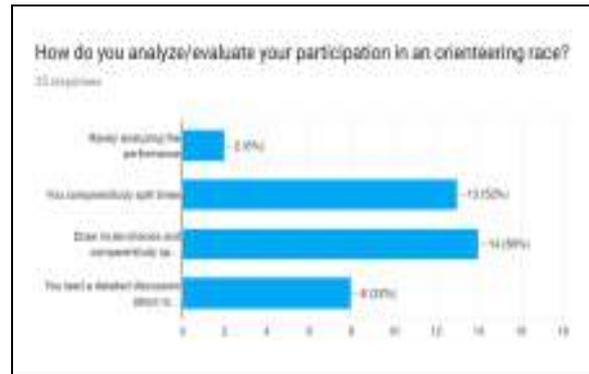


Fig. 12. How do you analyze/evaluate your participation in an orienteering race?

In the next question, we asked “How important is it to use GPS device to analyze the performance of an orienteering training/race according to you?” 12% of the surveyed athletes say that using GPS device is extremely important and 68% that it is Important. 16% of them took “More like important” for their answer. Only one person said it is “More like not important”, no one said it is not important (fig. 13.).

In the following question, we wanted to know if these same orienteering competitors do what they think one should. Only 24% of the surveyed athletes say that they always use GPS device to analyze their performance on an orienteering training or race. 36% answer that question with “Often”. 20% say that they “Sometimes” use GPS device to analyze their performance on an orienteering course and 16% that they only use it when it is available from the organizer (fig. 14.).

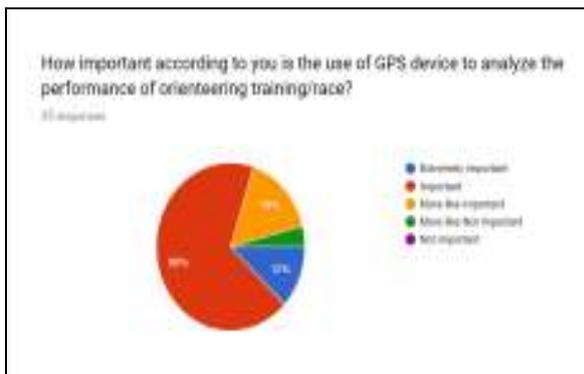


Fig. 13. How important according to you is the use of GPS device to analyze the performance of orienteering training/race?

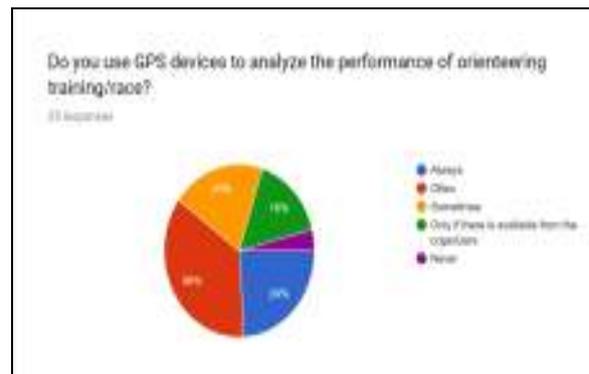


Fig. 14. Do you use GPS devices to analyze the performance of orienteering training/race?

No matters how will do it and how much data actually will use. It is even more important to use the result of the analysis when planning the next training schedule. When we asked the surveyed competitors from the world elite of orienteering how detailed their GPS analysis is 45.8% of them say that they use the GPS signal to see where they went through on the course but 41.7% of them use specialized software to compare their performance with others runners. In other words 41.7% of the surveyed athletes get the most out of the GPS devices after an orienteering training or race. 37.5% of these competitors analyze the GPS signal in details – direction changing, speed, stops and so on. 12.5% said they don’t use GPS (fig. 15.).

92% of the surveyed orienteering competitors answered positive to the question if preparing and organizing trainings may improve your technical skills. 48% of them took “For sure” and 44% - “More like Yes”. Both “I can’t decide” and “More like no” got one vote each (fig. 16.).

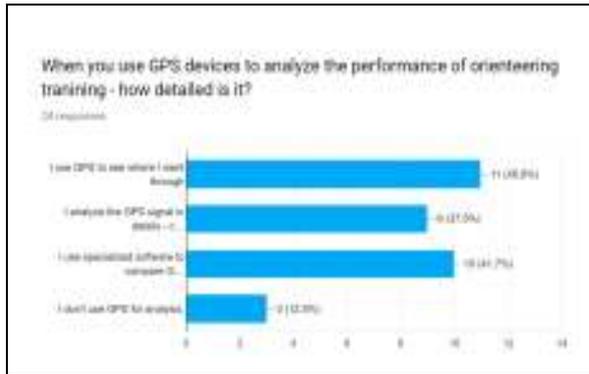


Fig. 15. When you use GPS devices to analyze the performance of orienteering training – how detailed is it?

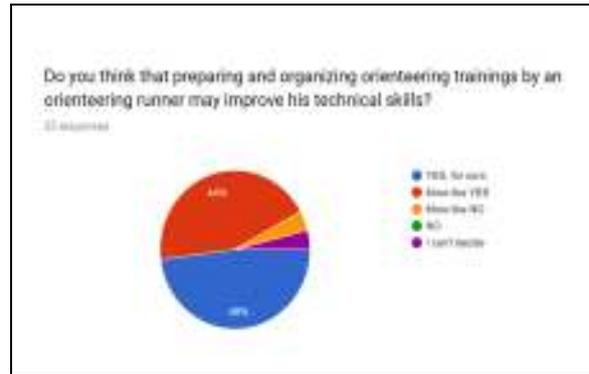


Fig. 16. Do you think that preparing and organizing orienteering trainings by an orienteering runner may improve his technical skills?

Same positive results were seen when we asked if map-making by an orienteer can develop and improve his technical skills. 40% of the surveyed athletes said that this would “For sure” help them improve their technical skills. 52% answered with “More like Yes”. Both “I can’t decide” and “More like no” got one vote each (fig. 17.). We think that drawing maps, updating older maps, organizing more training camps and organizing seminars to exchange experience and ideas are possibilities for technical improvement of orienteering competitors.

Also important as our opinion is involving as much as possible even the younger orienteering runners in preparing and organizing technical trainings and to encourage them to try map-making if possible.

In recent years, it is more than normal to see online GPS tracking during bigger national and local competitions. Sometimes you can also see such technologies used on club trainings and training camps. 44% of the surveyed athletes think that competitions in their home country should always have GPS tracking. 36% took “More like Yes” as their answer. 12% cannot decide and 8% took “More like No” (fig. 18.).

We believe that introducing of GPS analysis of an orienteering training or race to as many competitors is very important. It is necessary to teach and encourage all athletes to make deep and detailed GPS comparison after running the route. In addition, most of all try to include the conclusions of these analyses into their training schedules.

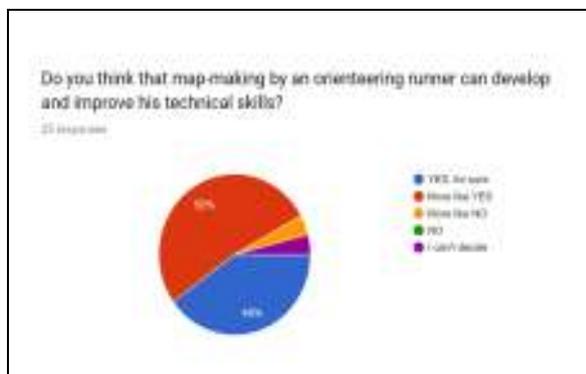


Fig. 17. Do you think that map-making by an orienteering runner can develop and improve his technical skills?

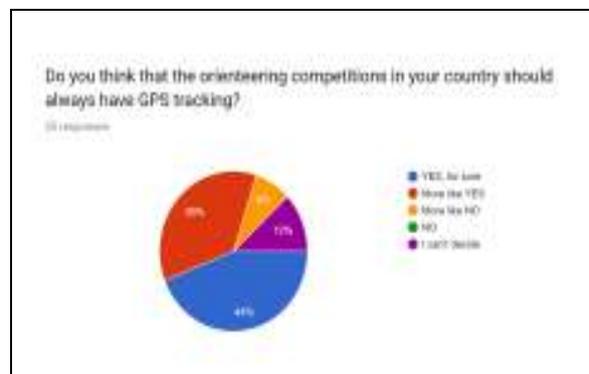


Fig. 18. Do you think that the orienteering competitions in your country should always have GPS tracking?

## Conclusions

1. Common is the opinion that between tree and seven technical trainings by month are better to improve their technical skills. These athletes do not think and rely on the races to maintain or improve their technical capabilities.

2. Relatively small group of the surveyed athletes think that one can improve his technical skills by participating in more orienteering races on monthly basis. This might be that way because the world elite orienteering runners are doing many specific training camps for the main races during the season and do not expect to improve their already very high set of technical skill in a regular orienteering race.

3. The physical shape without any doubt is directly connected with the technical performance during an orienteering training or race according to all surveyed athletes. It is top priority in the training schemes of 68% of these orienteering competitors.

4. All surveyed athletes are categorical that analyzing of the technical performance after a race or training is very important. Using GPS device for analysis according to them is necessary to develop as an orienteer. In the real world not all of these very convinced of using GPS for analysis orienteering competitors are analyzing their performances with that technology.

5. There is no question if preparing and organizing technical trainings or making orienteering maps will help an orienteer to develop, improve and extend his technical skills.

#### References

1. Георгиев А., Фролошка С. (1990). Ранното обучение по ориентиране, Медицина и физкултура, София.
2. Гърков, В. (2003). Беговата подготовка в ориентирането, НСА ПРЭС, София.
3. Гърков, В., Владимирев, В., Педев, Т. (2008). Изработване на карти за ориентиране, НСА, София.
4. Илиев, Л. (2015). Възможности за приложение на GPS проследяването за анализ на избора на вариант в спорта ориентиране, дипломна работа, София.
5. Сираков, И., Беломъжева-Димитрова, С. (2017). Проучване мнението на състезатели по ориентиране относно мястото на техническите тренировки и техния анализ в процеса на подготовка, В сборник от Международна научна конференция „Педагогическото образование – традиции и съвременност“.
6. Шопов, Ал. (2009). Специализирана подготовка за високопланински трекинги, дисертация, София.
7. Cych, P., Krompiewska, E., Machowska, W. (2011). Motives for participation in tourist orienteering. *Studies in Physical Culture and Tourism*, 18(2), 175-181.
8. International Orienteering Federation (2018). Competition rules for international orienteering federation (IOF) foot orienteering events, page 3, IOF.
9. Juga, L. (2017). Orienteering: a journey from the deep forest to the finn's living rooms. An overview of the orienteering as a sport from 2000 to 2015 in Finland. University of Jyväskylä. Faculty of Sport and Health Sciences. Social Sciences of Sport. Master's thesis.
10. Bird, S.R., Biol, M.I., Bailey, R., Lewis, J. (1993). Heart rates during competitive orienteering, *British Journal of Sports Medicine*; 27(1), p. 53-59.
11. Tsiligirides, T. (1984). Heuristic Methods Applied to Orienteering, Great Britain, Copyright Operational Research Society Ltd.