

УДК 796.56

## Theoretical Aspects of Technical and Tactics Training in Orienteering

Ludmila I. Alexandrova\*

Siberian Federal University

79 Svobodny, Krasnoyarsk, 660041 Russia <sup>1</sup>

Received 2.09.2011, received in revised form 9.09.2011, accepted 16.09.2011

---

*Orienteering is a kind of sports which lacks some researched technical and tactics characteristics and main requirements for combining different techniques, and no doubt that it affects the sportsmen's performance. Orienteering practice proves that fitness is not enough for the victory; it is vital to possess high technical skills in competitive atmosphere. Even leading sportsmen at the largest contests including World Championships can make technical and tactical mistakes. For beginners technical mistakes can suppress their results and ruin hours of efforts and trainings. So, the issues of technical and tactical training of the orienteers remain topical in the modern circumstances.*

*Keywords: orienteering, technical and tactical training, special exercises.*

---

### Point

The present article deals with an effort of summarising the experience of the leading specialists of orienteering and the author's personal findings.

During the contest, the orienteers find themselves in various kinds of activities. They should have the skills of running in different kinds of fields, map and keywords reading, using compass and making marks on control points. During the race it is crucial to be able to choose the course, the sequence of different navigation techniques and running speed.

Orienteering technique includes orienteering process and methods. It includes the technique of travelling on the field (such as running, jumping, obstacle crossing), the navigation technique (map reading, following the course, controlling distances, controlling the altitude,

map navigation, following the route, finding the landmarks, following the azimuth, running with simultaneous map reading), technique of control points location (reading the control points keywords, marking the control points, leaving the control points) (Alexandrova, 2008).

The main objective of technical and tactics training is consequent enlargement of conscious consideration objects while processing the details becomes almost automatic. So, the process of training can be explained as progressing upwards, from the smaller details to the larger ones; first, the techniques and operations are thoroughly studied, then trained so that they can be processed on the subconscious level (Shirinyan, 2008).

The methods of an orienteer's running training is different from that of a track-and-field athlete. Running technique is influenced by the type and condition of the soil, upward

---

\* Corresponding author E-mail address: ifkst@mail.ru

<sup>1</sup> © Siberian Federal University. All rights reserved

and downward slopes, such natural obstacles as thick woods, cliffs and rocks, trenches and mud-holes. Out of the great variety of the situation a sportsman may face the following points can be emphasized during the orienteering training: rough ground running, bog and loose sandy soil running, tallgrass running, climbing slopes and running down the slopes, crossing deep trenches, mud-holes and ditches; crossing obstacles. (Vyatkin, 2004).

When running on tussock or bouldery ground, the vertical fluttering of the point of gravity increases and the natural running rhythm breaks, because the length and frequency of the steps has to be varied. To reduce the vertical fluttering of the point of gravity it is possible to lower it a little, which means, to run with slightly bent knees. Such a style of running is not appropriate for running on a smooth path, but during tussock ground running it enables the sportsman to avoid dramatic fluttering of the point of gravity upwards and downwards, so-called “leaps” and “dips”. The pivot foot should not be straightened when planted on a tussock or a jutting out stone, while when planted between two stones, tussocks or into a small ditch, the pivot leg should be straight. In such cases, the push-off is performed mostly with the effort of the foot, while the extensors of the knee joints only assist the push-off. Short step length and high step frequency make running easier. Speaking about running for a long boundary distance, the sportsman should not be trying to jump from stone to stone or from tussock to tussock. The ability of varying step length and frequency, the knee and hip joint angle of the pivot leg when stepping on the ground enables the sportsman to optimise their technique and make the running smooth, not jump-like. The foot should be planted on the ground less abruptly and more cautiously than when road-running. Foot push-off can

be started only when the foot has been firmly planted on the ground.

Running on the bog, it is not always possible to predict from the look of the surface how deep the foot may sink into the bog; for this reason, power running manner does not appear efficient. When running on the moss moor and loose sandy ground, the foot is not supposed to do any kind of effort, because active push-off manner of running may result in feet sunk down in the moss or sand. On tussock bogs it is crucial to plant the foot on the bottom of the tussock, not on its top or into the gap between two tussocks.

To press the ground as little as possible, it is necessary to plant the foot flat on the ground and to avoid abrupt movement during the push-off. The hip should be risen higher and the step frequency should be increased, while the step length becomes shorter than when running in normal conditions.

During tallgrass or heather running the sportsman faces another kind of difficulties: while the push-off becomes secondary, the major part is played by the swinging movements of the leg with the hip raised up. When running in such conditions, the hip rise and knee joint angle should be increased. The calf “folds up” under the hip and is swung high from the ground not to hitch the grass, the heather, tussocks, logs or any other kinds of obstacles.

Climbing slopes technique depends on their steepness, length and type of ground. Short slopes with firm ground (like a road or a path) are climbed with short steps with emphasized foot push-off. This efficient method of slopes climbing though not very fast, enables to continue running with maximum performance after the climb.

Steep excessive gradients with soft or uneven ground should be climbed with fast and firm steps which enables to save the breath and not lose too much of the speed. Short but steep slopes are to be run with the maximum performance, so that

it does not require long time for regaining the strength afterwards. When climbing some steep slopes it is possible to take the advantage of any kinds of “natural stairs” (steps, stones, brows), because pushing off from a slanted surface is less efficient than a gently inclined or horizontal surface. With the slope steepness exceeding 20 % (very steep slopes) it is more efficient to move traverse-wise. If the diameter of the trees growing on the slope is not too big, it is possible to use hands for assisting the climbing by pulling up. As the linear velocity of the sportsman is not high at the moment, it enables them to read the map in a better and fuller way, taking the advantage of the slope climbing for taking tactic decisions for the next fracture of the course. Climbing gently inclined slope is hardly different from running on a plain.

Running down the slopes of different steepness requires applying different methods. While running steeply downhills, the running speed decreases in comparison with the speed of running on a plain. So, the task of winning the speed can be set only while running down short or gently inclined slopes. Gently inclined slopes with firm ground are run with ordinary progressive run, but in a more relaxed manner than usual. It enables the sportsman to regain the strength, especially if the downhill running was preceded with a climb or a fast running track (for example, a road). Steeper slopes are run with shorter and more frequent steps. The steeper the slope is, the more it is necessary to lean the torso backwards. The foot should be planted on the ground from heel to toe to reduce the velocity and decrease the risk of being injured by falling over. “Natural stairs” of every steep slope enable the sportsman to apply the same techniques during running downhill as uphill. On the lower part of a steep slope (if visible) the slowdown should be ceased, the torso should be leaned forward and the rest of the distance should be run with the maximum

performance. It is especially crucial when steep downhill and uphill slopes interchange, because it enables the sportsman to gain the speed before the next set of uphill run. An ability to run in a relaxed manner, maintaining high step frequency but not picking up the dangerous speed has a great meaning in this case. It is very important to be able to regain strength while running downhill to maintain high velocity on the plain and other parts of the route.

During crossing natural obstacles with steep slopes facing each other it is extremely important to be able to overcome the lowest point in the right way and not to lose the speed while passing from running downing to uphill. The most popular mistake is an attempt of “jumping” to the opposite slope without reaching the bottom of the ditch. Abrupt slow-down that occurs in this case makes the sportsman lose their speed. To avoid it, the last two or three steps of the downhill running should be very short, the knees should be slightly bent and not totally straight in order to lower the gravity point of the body. In the lowest point (the ditch bottom) the pivot leg is planted straight. When stepping to the opposite slope, the gravity point is slightly lowered because of the bent hip and knee joints. By doing so, the sportsman “smoothen” their gravity point movement trajectory and decreases the vertical speed-up.

Drains and brooks 2-3 metres wide should be jumped over by using a powerful swing, bending or falling forward when landing. It is especially efficient in bad weather conditions because it does not lead to drenching the footwear and cooling the muscles. As a place for pushing off, the one closer to a tree should be preferred because the ground is always hard near the tree roots. Performing the jump, the accent should be made not on the push-off, but the speed-up and a good powerful swing. (Losev, 1984)

It is better to get over fallen trees with a jump or a hurdle step. The safest way to perform

it is a jump with planting one foot on top of the obstacle. The foot that steps on the obstacle should never be straight; it should be bent to minimize the vertical fluttering of the gravity point. It is necessary to make sure that the foot does not slide on the tree's bark or that the foot does not sink into the rotten timber. Medium height obstacles (above the knee level) should be gotten over with one-hand support. When there is no opportunity of jumping over the tree and it is necessary to creep under it, it is crucial to watch other sportsmen so that no one else steps on top of it. (Alexandrova, 2008)

Hurdle step can be applied only when crossing obstacles 50-70 cm. high, as long as the hurdle step technique has been trained and overlearned. If not, trauma probability is too high. Obstacles under knee level high are better to be crossed without jumping. The last step before the obstacle should finish very close to the obstacle, after that the swing-up leg should be risen high by means of raising the hip and bending the calf, and the leg which is left behind the obstacle goes over the obstacle with slight moving the hip to the side (like when doing the hurdle step) (Vyatkin, 2004)

An ability to fall in the right way is extremely important. In case of unexpected fall it is necessary to ball the legs, not to try to slow the fall down with a hand (especially with the one which is holding the compass), to fall on the side and roll over as many times as it is necessary to make the fall smooth. But, when falling on a steep slope, it is forbidden to ball up the legs to prevent rolling downhill; it is much better to turn the face to the slope and spread out the arms and the legs. This way of falling is less traumatic. To avoid falls and injuries, it is better to learn predicting the condition of the slope. (Losev, 1984)

Very often orienteers have to run in the woods with some underwood. In such conditions the movements of hands and body become

crucial. Getting round small trees and bushes, the sportsman uses techniques that resemble those of the slalom: the hands are relaxed, sometimes they are used for pushing some tree-branches aside, the movement starts from the shoulder joint, the step length is varied. In thick underwood the sportsman bends down as they run, one of the hands sticking forward to protect the face from tree-branches. The head should be bent forward. (Losev, 1984)

Orienteering technique includes the following constituent parts: map-reading; following the course; distance control; following the map; following the landmarks; following the route; following the azimuth; control points' marking.

Map-reading is an important technique. It is necessary to be able to see the field behind the map and to see the map behind the field. Fast map-reading and the map understanding skills should be acquired at the trainings. After the training, during the recovery jog, it is useful to be reading any kind of map. It is obligatory to learn reading any kind of landscape: gullies, hummocks, large terrain, floodplain valleys, landscape with a road network etc. We know that beginners do the map-reading while they are walking, but advanced orienteers don't slow down their run for the map-reading; it corresponds to the opinion of Shirinyan A.A. (2008).

The ability to read the map and compare it to the real landscape is the most complicated and at the same time the most important component of the orienteer's skills. Map-reading can be divided into separate but interconnected elements, such as reading the distance data, pointing out the key elements, remembering and analysis.

From the experience of training different categories of orienteers, it has been drawn that for the right perception and comparison of the map data and the landscape peculiarities, the map should be turned in such a way that the Duppereys

lines on the map are pointing north. The map can be turned in the right way with the help of the compass or without it. It is easier to turn the map by pointing out some straight linear landmarks, such as glades, ditches, field edges etc. If the map is turned in the right way, it is much easier to find the objects on the map and to identify the landscape details depicted on the map. When the direction of the movement is diverted, for example if the road the sportsman is running along turns to different direction, the angle of the map should be corrected for it to remain positioned in the right way. The ability to change the map position without compass should be constantly improved at the trainings. The best exercises for this are “straight orienteering” exercise and marked route orienteering (Alexandrova, 2008).

Map-reading can be facilitated by folding the map in the right way and by holding the thumb on the place where the sportsman is currently located. A big map is not convenient to use, because it has to be folded, but it is possible to fold the map in such a way that the crucial data does not get out of sight. It is comfortable to work with a map which is not larger than 15 x 20 cm when folded. As a rule, it is enough to keep the whole stage between two control points in sight, if the distance between them does not exceed 2 km. (Shirinyan, 2008). It can be also suggested that the visible part of the map is minimized to 5 x 10 cm to keep the map from damage and water if it is not protected by any kind of hermetic package. It also enables the sportsman to position the map in the most convenient way for realizing their tactic techniques.

Following the route, the thumb should be moved on the map following the sportsman’s location. This method is called “thumb method”, it facilitates finding the necessary point on the map faster.

Another important factor of facilitating map-reading is an ability to hold the map in

the right distance from the eyes for several seconds, shockless, without slowing down the run. It is crucial to be able to memorize as much information as possible during the minimal period of time, which emphasizes the importance of visual memory development. Though possible to learn at the trainings and competitions, it usually comes with the experience.

While following the route, involuntary memorizing plays a very important role of not only enabling the sportsman to pay more attention to other tasks (for example, tactic tasks), but also of remembering unusual, outstanding landmarks that facilitate controlling the route in the most efficient way.

The most complicated thing of following the route is imagining the landscape as map signs. In this case, the processes of route following and map-reading not only intercross, but also complement each other. The optimal proportion can be described as follows: the map image and the route image are kept in the memory in the same details, and any other subsequent action will not make the person rebuild the images in the memory but only complete it with the new data. (Bliznevskaya, 2005; Voronov, 2002).

There are several ways of distance control: step counting, following landmarks, by sight, by senses, by time. The distance can be measured on the map with the help of compass ruler or by sight.

Applying muscle and visual senses for distance control is based on the comparison with the reference senses which are kept in the memory (in linear measure units or other references acquired while performing the previous operative actions).

Direction control is performed according to the landmarks, direction sense, the sun, but the main technique is using the compass: accurately by azimuth or roughly by the compass arrow.

Altitude control is required on the moderately rugged and rugged terrains. The altitude can be controlled by the landmarks or by senses (altitude sense).

Map orienteering is the most frequently used technique, which professional sportsmen apply subconsciously, without thinking about it deliberately. The map can be oriented by the compass, by the sun, by the landmark or by the direction sense.

Directional movement is a rough orienteering method which is used when it is necessary to reach a well-visible landmark and there is no way of taking advantage of any other facilitating landmarks. The direction is taken from the map or from the landmarks, or using the compass arrow or the sun.

Landmark movement is also a rough orienteering method which means using previously selected facilitating landmarks (or landmark combinations) for reaching the destination. The main part in this case is played by distance control and rough map-reading. The movement is performed mainly along linear landmarks located one-two sight distances away from each other. The third variant of landmark movement is horizontal run or crosswise run. (Alexandrova, 2008).

Azimuth movement is an accurate orienteering method when less visible and less expanded landmarks are used. (Geletskiy, 2001).

Azimuth identifying skills can be trained in a forest, on a stadium, in a gym etc.

One of facilitating techniques is marking the control point which consists of reading the keywords (to ensure the control point location in reference to the landmarks and its number), preparing a card or a chip for marking, the marking itself and visual or audial marking control, after which the sportsman leaves the control point in the right, appropriate way.

Correct and precise marking at the control point is the main factor for the judges to decide on the correctness of the course. When marking a card it is necessary to ensure the puncher hole matches the corresponding box, and during the electronic punch marking it is necessary to wait for the confirmatory signal (Alexandrova, 2008).

We know that technique training depends a lot on the experience and condition level of the sportsman, along with his natural talent. At the same time along with the technique skills their tactic skills are also improved, and the tactics mean choice and application of some certain techniques and methods during the competitions.

Orienteering tactics include such actions as option selection, route selection, velocity control, tactic planning between the control points and also specific tactic actions connected with the current situation like the initial stage of the race or the finish of the race, head-to-head competition etc. (Alexandrova, 2008).

To solve any kind of tactic task, it is necessary to assess the current situation first. Assessing the current situation means considering all the factors that may influence the solution of the task and assess their relevance. In any situation there are both temporary and constant factors. Tactics mean being able to assess the situation in the right way and make a decision.

At first a general decision should be made, then the details of it are worked out. The more experienced the sportsman is, the higher their level of technical and tactical skill is, the more detailed is the decision. The skill of solving different kinds of tasks is improved during trainings and competitions, that is why in similar standard situations qualified sportsmen think in a more general way in comparison with beginners; they make these decisions almost automatically (Shirinyan, 2008).

Route selection is the main tactic task in running orienteering. For route selection,

the main landmarks are selected first. The option selection begins with the preliminary assessment of the terrain where the sportsman is supposed to be running, which is done with the help of the map. The route selection is usually done before leaving the control point for the next one. Special attention should be paid to assessing the control point location, which is the destination for the current stage ("route selection starts from the control point location). The last fixing, as the most reliable and easily identified point of orienteering should be specified. After that, the direction (straight, right, left) is selected and the mediate landmarks, orienteering techniques are determined.

The closer to the control point the last fixing is, the faster and the safer the stage will pass.

It is extremely important to be able to apply the following techniques: "prolonging the control point"; slowing down the velocity; accurate movement according to the azimuth; step counting and others. It is crucial to consider the peculiarities of the map, its accuracy, readability, the passability of the terrain, the woods location, the road network, the dimensions of minor objects depicted on the map. Other considerable factors for defining the tactics are the weather conditions, the time, the season and the equipment the sportsman possesses. It is necessary to take into consideration the course set by the setter (the control points' prism, its visibility, its location relatively to the landmarks).

In mountainous regions route selection is influenced not only by the necessity of reducing the altitude, but also by the steepness of the slopes.

On the start, on the stages between the control points, it is necessary to solve several tasks. On the start and in the beginning of each stage it is necessary to make two decisions: the rough route and the optimal orienteering technique.

A short stage (not exceeding 500 m) which does not include any considerable obstacles, is usually run in a straight line by azimuth motion. If the map is complicated, it is necessary to read it on the run, if the terrain is plain, it is enough just to memorize the main landmarks.

On a long stage it is possible to combine the techniques depending on the conditions. The selected route option should be put into practice and not replaced with another one in the process. Even if the initial option is not the best one, changing the route is always more time-consuming.

Running and decision-making velocity, the complexity of the map and the terrain should be closely interconnected. If the course and the map are plain the sportsman can run with high velocity, using linear landmarks and rough fixings. In a more complicated cases the run should be slowed down or it can even be useful to make a stop to use some more accurate orienteering methods.

There is a suggestion that thinking velocity directly depends on the running velocity and length. The more tired you are, the slower and worse you think. (Ogorodnikov, 1978). But other authors suppose that orienteers work out an ability to orient accurately and quickly on the level of anaerobic limit (Cheshikhina, 2006, Bizyukin and others, 2009)

When interacting with the competitors, the sportsman faces the problem of solving some special tactic tasks. First, the orienteers can use each other for facilitating the terrain control. Seeing the rivals on the route leads to limiting the number of accurate orienteering (joining the flock of the competitors, applying "head-on running", using alternative paths etc.). An advanced sportsman has to learn, firstly, using his rivals, cooperating with them while moving along the course together, but secondly, being able to switch on to individual route, reach the

control point and run away from the flock. In any case, individual work will lead to success not only in one certain race, but during the whole sport career. Some authors (Kostylev, 1995) suggest that any kind of cooperation is harmful for the development of a sportsman's leadership qualities, but the practice shows that even on World Championships (especially relay race championships) such cases do happen and the participants do not lose an ability to develop themselves, but, on the contrary, bring fame and medals to their motherlands.

Sometimes it is necessary to solve the problem of drawing away from the rivals during the relay race or the team competition. If speeding up is not enough, it can be useful to imitate being marking a control point or, having selected the route till the control point, memorize it and speed up without looking at the map.

Tempo and rhythm selection as a tactic task is inevitable in many kinds of sports. The tempo affects the physical tiredness which can limit the intellectual capacity of the orienteer. Selecting the right rhythm means seeing the optimal sequence of actions on the course. The rhythm is determined by the following tactic tasks: route selection, cooperation with the rivals, getting over the tiredness in the end of the race. It is necessary to react at the change of complexity of different stages of the course, especially at the way it is requires having look at the map when rough orienteering should be replaces with accurate. It is crucial to learn how to handle the situations that occur when as a result of wrong actions a mistake has been made and it is necessary to come to a decision how to correct it with little waste of time.

When the orientation is lost it is necessary to calm down, concentrate, return to the closest landmark and start the motion over again.

When starting a new race, the sportsman should be having a distinct tactic plan.

Tactic plan selection is influenced by the: level of the competition, other competition details and tasks.

### **Example**

Due to the popularization and development of the orienteering as a kind of sports that was considered to be worth being included into the Olympic Games programme, which usually includes spectacular sports (Bliznevskiy, 2010). The competitions have a high speed, do not take up too much time, they are held on technically complicated terrains.

An orienteer should be able to make decisions as quick as possible and speed up the performance of orienteering techniques under the circumstances of tough competition.

Leading researchers and coaches who have studied the opportunities for improving results in orienteering, a century ago came up with quite a big number of exercises for developing some certain skills and abilities. They were described in books "100 tasks on technical, tactical and psychological development of an orienteer" by D.M. Nikiforov, "Training advanced orienteers" by A.S. Losev, "Training orienteers" by B.I. Ogorodnikov and other books that describe the basics of technical and tactical improvement.

Improving technical and tactical skills and their elements is to be included into the training program all year round.

Out of the whole variety of traditional preparatory exercises we have selected the most important ones for running orienteering:

- running through the woods (with various intensiveness);
- running across bogs;
- sand running;
- snow running;
- uphill running (with various intensiveness);



- traverse slope running (“horizontal” running);
- running through bushes;
- crossing natural and artificial obstacles (logs, abates, stones, walls etc.);
- multiple jumps on ground and sand;
- various distance running in different conditions (sand, bushes, slight uphill, downhill, tallgrass etc.);
- various kinds of skip jumping.

The base of all these exercise is running, because it is fast motion which determines good results in orienteering.

During practice we have worked out and applied new exercises for improving technical and tactical skills: “ants” exercise, “fan relay race” exercise, “star” exercise, “head-on relay race” exercise, “pursuit” exercise, “mountain relay race” exercise that can be done on different terrains.

Each of these exercises is to be done at a competitive speed, with head-to-head race with a potentially equal rival.

“Ants” exercise: on a field squared not more than 2500 m<sup>2</sup> from 10 to 20 control points are chaotically distributed. Each of the control points has a unique number from 31 to 50. Each sportsman is handed a description sheet with certain order of marking the control points. Usually it makes from 4 to 8 loops of 12-15 control points each with an intermediate finish at the starting point. The task of every orienteer is to run the course as fast as possible, marking at each control point in accordance with the description sheet.

“Star” exercise: each sportsman is handed a large scale (up to 1:4 000) map with the course marked on it and keywords without numbers. On the field around the control point there are 2-3 control points installed on different landmarks. The sportsman has to identify their control point according to the keywords in their description

sheet. Every wrong attempt adds from 5 to 10 penalty seconds to the final result. The fastest and the most attentive one wins.

“Fan relay race” exercise: this exercise is a relay race on certain course of subsequent stages. A team of two players (a male and a female, for example) is handed one map with a large number of loops (usually 8-12). One loop should not exceed 3-4 minutes of running time (winner’s time). First stages start altogether, but each team starts its own loop. The baton is passed by passing on the map. Further each team moves one loop to the right (“fan principle”). The fastest team wins.

“Head-on relay race” exercise: the players do the exercise in pairs, each participant having a personal loop, opposite to his partner’s. The task of each is to run both loops with less mistakes in orienteering and with less time.

“Pursuit” exercise: the first sportsman starts the loop earlier than the second sportsman. The task of the first sportsman is to run away from the second, while the second is aiming at catch up with the first. It is also required to do the course with as few mistakes in orienteering as possible. This training exercise is especially efficient on a terrain with multiple minor landmarks and bad visibility.

“Mountain relay race” exercise is one of the most efficient ways of developing special stamina with orienteering elements. The exercise is done as follows: the sportsmen of the first group start at one loop consisting 2-3 control points at maximum speed and the most accurate orienteering. The return way is always uphill. Having passed this loop, the baton is passed on to the sportsmen of the second group who run the same loop under the same conditions. The task of each sportsman is to run the course as fast as possible with as few orienteering mistakes as possible. This exercise is especially efficient when it is possible to place the starting point on top of a hill with slopes with

multiple minor landmarks and surrounded by heavy-going hummocks.

### Resume

Coming to the conclusions of our work, it is possible to claim that nowadays to reach good results in orienteering, besides the

fitness, it is necessary to be able to reveal the high level of technical and tactical skills in the conditions of competition on short and medium distances.

For improving technical and tactical training it is necessary to keep implementing new special exercises into the training routine.

### References

L. I. Alexandrova, S.V. Bizyukin, Y.V. Efimova, "Testing as one of the ways to improve the orienteering performance", *Physical education in the education system: Collection of research and practice conference articles*, (2001), 71-75 (in Russian).

L.I. Alexandrova, S.V. Bizyukin, L.Y. Stanchenko, "Opportunities for improvement of speed and strength skills of orienteers at a higher education establishment", *Physical education in the education system: Collection of VI All-Russia research and practice conference article*, (2003), 141-145 (in Russian).

L.I. Alexandrova, S.V. Bizyukin, M.N. Melnikov, L.Y. Stanchenko, "Terrain assessment in orienteering", *Physical education in the education system. Health-saving technologies: International symposium materials*, (2004), 74-75 (in Russian).

L.I. Alexandrova, S.V. Bizyukin, S.Y. Merentsov, "Researching orienteer sportsmen' condition", *Physical education in the education system. Health-saving technologies: International symposium materials*, (2004), 75-76 (in Russian).

L.I. Alexandrova, S.V. Bizyukin, N.A. Vostrikova, "Controlling physical aptitude in orienteering", *Physical education in the education system: Collection of IX All-Russia research and practice conference articles*, (2006), 216-220 (in Russian).

L.I. Alexandrova, S.V. Bizyukin, E.A. Nikolayev, N.A. Vostrikova, S.Y. Merentsov, "Peculiarities of physical aptitude of modern orienteering sportsmen", *Physical education in the education system: Collection of X All-Russia research and practice conference articles*, (2007), 266-269 (in Russian).

L.I. Alexandrova, S.V. Bizyukin, S.Y. Merentsov, *Physical education and sports techniques: orienteering: Teaching materials complex*, (Krasnoyarsk: Continuing Education Institute of SFU, 2008), 75.

L.I. Alexandrova, S.V. Bizyukin, A.I. Gett, S.Y. Merentsov, "Peculiarities of SFU orienteering section training routine", *Physical education in the education system: Collection of X All-Russia research and practice conference articles*, (2009), 5-8 (in Russian).

L.I. Alexandrova, S.V. Bizyukin, E.A. Pergat, A.I. Gett, "Assessing preparedness of orienteering sportsmen for competitions" *Physical education in the education system: Collection of XII All-Russia research and practice conference articles*, (2010), 4-9 (in Russian).

S.V. Bizyukin, L.I. Alexandrova, S.Y. Merentsov, M.A. Frolova, "Controlling the technical skills of orienteers", *Physical education in the education system: Collection of X All-Russia research and practice conference articles*, (2009), 15-17 (in Russian).

V.S. Bliznevskaya, "Ski orienteering techniques in competitive conditions", *Theory and practice of physical education*, 11 (2005), 28-30 (in Russian).

V.S. Bliznevskaya, *Summer training routine of ski orienteers: Monography*. (Krasnoyarsk: Krasnoyarsk State Technical University Press, 2001), in Russian.

A.Y. Bliznevskiy, "Perspectives for different kinds of sports of being included into the Olympic Games' program", *Theory and practice of physical education*, 11 (2010), 71-73 (in Russian).

A. Y. Bliznevskiy, "Ski Orienteering as an independent branch within orienteering sports", *Theory and practice of physical education*, 3 (2004), 39-42 (in Russian).

V. Burtsev, *Joined and dispersed running at orienteering competitions. Analysis. Research. Ideas* (Moscow: Academprint, 2008), in Russian.

A.V. Vapaeva, S.V. Bizyukin, L.I. Alexandrova, "Prestart preparation in orienteering", *Physical education in the education system: Collection of X All-Russia research and practice conference articles*, (2009), 21-25 (in Russian).

Y. S. Voronov, *Basic preparation of orienteering sports reserve* (Moscow.: Youth Centre of Tourism and Regional Ethnography, 2001), in Russian.

Y.S. Voronov, "Efficiency of technical and tactic activities of high qualified orienteers at a competitive course" *Improving training routine of ski racing and orienteering: article collection*, (2002), 14-21 (in Russian).

Y.S. Voronov, "Managing the training process of young orienteers in respect with the age dynamics of special skills", *Theory and practice of Physical Education: Coach: a journal inside a journal*, 7 (2005), 37-38 (in Russian).

L.A. Vyatkin, E.V. Sidorchuk, D.N. Nemytov, *Tourism and orienteering : teaching aid for pedagogical institutes, speciality* (Moscow: ACADEMIA, 2004), 208.

V.M. Geletskiy, A.M. Lopatin, "Tests for controlling the technique of changing the route for orienteers", *Physical education in the education system: Collection of research and practice conference articles*, (2001), 75-78 (in Russian).

"Azimuth" magazines – Moscow.: RF FGS, yy. 1999-2010. (in Russian)

T.M. Zenina, "Reasons of sportsmen's mistakes at orienteering competitions", *Young researchers' article collection*, 3 (1996), 48-50 (in Russian).

B.I.Ogorodnikov, A.L. Moiseenkov, E.S. Priymak, *Collection of tasks and exercises on orienteering* (Moscow: Physical education and Sports, 1980), in Russian.

Y.S. Konstantinov, O.L. Glagoleva, *Orienteering classes* (Moscow: Youth Centre of Tourism and Regional Ethnography, 2005), in Russian.

V.M. Kostylev, *Orienteering philosophy, or some recommendation to an orienteer who wishes to be the leader* (Moscow.: Russian Federation Youth Centre of Tourism Press, 2000), in Russian.

A.R. Kuzmin, "Orienteering as a kind of sports, as the way of recreation and as a lifestyle" *Ways of developing innovative sports and recreational programs for children and youth: Article collection*, (2000), 20-23 (in Russian).

A.S. Losev, *Orienteers' training routine* (Moscow: Physical education and sports, 1984), in Russian.

T. Morgunova, *Teaching aid. Teaching and controlling tests on orienteering* (Moscow: Soviet Sports Press, 2008), in Russian.

L.D. Nazarenko, O.E. Danilchenkova, "Improving agility of young orienteers", *Physical education: teaching, educating, training: Children's coach: Journal inside a journal*, 3 (2005), 28-31 (in Russian).

B.I. Ogorodnikov, A. N. Kercho, L. A. Krokhin, *Training orienteers* (Moscow: Physical education and sports, 1978), in Russian.

V. E. Borilkevich and others, *Running basic in orienteering* (Saint-Petersburg: Saint-Petersburg State University Press, 1994), in Russian.

N.A. Prokhorov, L.I. Alexandrova, S.V. Bizyukin, L.V. Stepanova, "Assessing the physical fatigue of orienteers. Electrocardiogram as a method of physical fatigue assessment", *Young researches in medicine: collection of XI All-Russia research and practice conference materials*, (2006) (in Russian).

K. Prusik, "Orienteers' special skills assessment criteria", *Modern Olympic sports and sports for everyone: Collection of 7<sup>th</sup> International research and practice congress materials*, Volume 3 (2003), 80-81 (in Russian).

T. Ryabkina, *Tania Perelyaeva's junior victories* (Moscow: Academprint, 2005), in Russian.

L.I. Alexandrova, S.V. Bizyukin, S.Y. Merentsov, *Physical and sports activities' techniques: orienteering: teaching suggestions for practical classes* (Krasnoyarsk: Continuing education institute of SFU, 2008), in Russian.

A.A. Shirinyan, A.A. Ivanov *Training routine of a modern orienteer* (Moscow: Academprint, 2008), in Russian.

V.V. Cheshikhina, *Modern training system in orienteering* (Moscow: Soviet Sports Press, 2006), in Russian.

W.M. Bennis, Th. Pachur, "Fast and frugal heuristics in sports" *Psychology of Sport and Exercise*, Volume 7, Issue 6, (November 2006), 611-629.

A. Leumann, V. Valderrabano, B. Hintermann, "Orientierungslauf". *Sportverletzungen (first edition)*, (2006), 411-415.

P. Vansteenwegen, W. Souffriau, G.V. Berghe, D.V. Oudheusden, "A guided local search metaheuristic for the team orienteering problem", *European Journal of Operational Research*, 1(196) (2009), 118-127.

W. Souffriau, P. Vansteenwegen, G.V. Berghe, D.V. Oudheusden, "A Path Relinking approach for the Team Orienteering Problem", *Computers & Operations Research*, 11(37) (2010), 1853-1859.

P. Vansteenwegen, W. Souffriau, G.V. Berghe, "The orienteering problem", *A survey European Journal of Operational Research In Press*, Available online 2 April (2010).

R. Ramesh, K. M. Brown, "An efficient four-phase heuristic for the generalized orienteering problem", *Computers & Operations Research*, 2(18) (1991), 151-165.

A. Moran, "Cognitive psychology in sport: Progress and prospects", *Psychology of Sport and Exercise*, 4(10) (2009), 420-426.

L. Cereatti, R. Casella, M. Manganeli, C. Pesce, "Visual attention in adolescents: Facilitating effects of sport expertise and acute physical exercise", *Psychology of Sport and Exercise*, 1(10) (2009) 136-145.

M.Weed, "Research quality considerations for grounded theory research in sport & exercise psychology", *Psychology of Sport and Exercise*, 5(10) (2009), 502-510.

B.T. Johansen, "Thinking in orienteering", *Scientific Journal of Orienteering*, 13 (1997), 38-46.

R.Seiler, "Cognitive processes in orienteering: A review", *Scientific Journal of Orienteering*, 12 (1996), 50-65.

T. Ottosson, "Cognition in orienteering: Theoretical perspectives and methods of study", *Scientific Journal of Orienteering*, 12 (1996), 66-72.

K. Almeida, "Decision making in orienteering", *Scientific Journal of Orienteering*, 13 (1997), 54-64.

## **Теоретические аспекты техничко-тактической подготовки в спортивном ориентировании бегом**

**Л.И. Александрова**

*Сибирский федеральный университет  
Россия 660041, Красноярск, пр. Свободный, 79*

---

*Спортивное ориентирование является видом спорта, где недостаточно изучены особенности технико-тактических характеристик и основных требований к комбинированию технических действий, что, безусловно, сказывается на успешном выступлении спортсменов. Практика спортивного ориентирования показывает, что для достижения побед при мало отличной физической подготовленности необходимо владеть высоким техническим мастерством выполнения всех приемов в соревновательной обстановке. Даже ведущие спортсмены совершают технические и тактические ошибки на крупнейших соревнованиях, вплоть до чемпионатов мира. У начинающих ориентировщиков ошибки в технической подготовке могут надолго задержать рост результатов, несмотря на большое количество сил и времени, потраченных на тренировках. Поэтому вопросы технико-тактической подготовки спортсменов-ориентировщиков остаются актуальными в современных условиях.*

*Ключевые слова: спортивное ориентирование, техническая и тактическая подготовка, специализированные упражнения.*

---