



Influence of kinesiological means on the motor fitness of 15-16 years-old skiers-racers

UDC 796.92



Postgraduate student **D.E. Golovko**¹
 Dr. Hab., Associate Professor **A.I. Zagrevskaya**¹
 Dr. Med., Professor **T.A. Shilko**¹
¹National Research Tomsk State University, Tomsk

Corresponding author: a.zagrevskaya@yandex.ru

Abstract

Objective of the study was to determine the effect of kinesiological means on the motor fitness of 15-16-year-old ski racers.

Methods and structure of the study. The following methods were used in the scientific experiment: analysis of literary sources according to the methodology of organizing the training process of cross-country skiers, testing of motor fitness, pedagogical experiment, methods of mathematical statistics. Experimental work was carried out on the basis of the Children's and Youth Sports School No. 1 of the Tomsk region of the Tomsk region. The study involved 120 skiers aged 15-16, of which experimental and control groups were formed, 60 girls in each group.

Results and conclusions. In the course of the study, a block of tools was developed, which includes four kinesiology modules of various target orientations: preparatory and warm-up, basic (load), basic (shortened), warm-up and competitive. Each of these modules solved specific goals and objectives, depending on the period of preparation. As a result of the study, a significant increase in the results of motor fitness of female athletes of the experimental group was recorded, which indicates the effectiveness of the proposed means.

Keywords: *kinesiological means, motor readiness, skiers-racers, training process.*

Introduction. Modern cross-country skiing is characterized not only by an endurance sport, but also by a speed-strength and situational type of sports activity, which significantly increases the requirements for motor, technical and speed-strength training of female racers.

An integral part of cross-country skiing is training and competitive activity, which is a multicomponent integrative process of psychomotor development and motor fitness of female athletes [1, 2, 4].

In this regard, the problem of finding effective means aimed at improving the motor fitness of female athletes, on which the result of competitive activity largely depends, is actualized. In our opinion, effective means of developing motor qualities are kinesiological means that have an integrative effect on both motor fitness and psychomotor development of cross-country skiers.

Objective of the study was to determine the effect of kinesiological means on the motor fitness of 15-16-year-old ski racers.

Methods and structure of the study. Experimental work was carried out at the Children's and Youth Sports School No. 1 of the Tomsk region. The study involved 120 skiers aged 15-16, of which experimental and control groups were formed, 60 girls in each group. A pedagogical experiment to determine the effectiveness of the use of kinesiological means in the training process of cross-country skiers aged 15-16 years was carried out for one year.

Results of the study and their discussion. In the course of the experiment, we developed a block of tools that includes four kinesiology modules of various target orientations: preparatory and warm-up, basic (load), basic (shortened), warm-up and competitive. Each of these modules solved specific goals and objectives, depending on the period of preparation. The duration of the preparatory-warm-up module was 20 minutes (11.2% of the total time of the training session). This module includes five strictly regulated exercises: "Hand - Palm - Fist" (visual command); "Hand - Palm - Fist" (sound



command); “Splashes, lying on the stomach (sound commands)”; exercise “Splashes, lying on your back (visual command)”. The preparatory-warm-up module was used in the recovery and preparatory periods of training, as well as in the preparatory and final parts of the lesson in the competitive period.

The basic (load) kinesiology module was used in the preparatory period in the main part of the sports training. The duration of this module was about 30 minutes (16.7% of the total time of the training session). In terms of content, the basic kinesiology module consists of seven strictly regulated exercises, such as: “On the toe” - On the heel - On the knee”; “Forward facing stand - lying emphasis (sound command)”; “Stand facing forward - emphasis lying (visual command)”; “Jumping to the side on the supporting leg (sound command)”; “Jumping to the side on the supporting leg (visual command)”; “Splashes in motion, facing forward (visual command)”; “Bursts in motion, turning backwards (sound command)”.

In the competitive period, the basic (load) kinesiology module was used in a shortened version (basic shortened module) lasting up to 15 minutes

(8.3% of the total time of the training session). In terms of content, the basic (shortened) module consists of four strictly regulated exercises, such as: “On the toe” - On the heel - On the knee”; “Stand facing forward - emphasis lying (visual command)”; “Jumping to the side on the supporting leg (sound command)”; “Splashes in motion, facing forward (visual command)”.

During the competitive period from November to April, in the structure of the warm-up, immediately before the competitive activity, a warm-up-competitive kinesiology module was used, which in its structure consisted of three strictly regulated exercises: (“Forward facing stance – lying emphasis (sound and visual command)”; “Jumping to the side on the supporting leg (visual command)”; “Splashes in motion, turning his back forward (sound command)”.

The maximum duration of the competitive warm-up module was 15 minutes (on average 37.5% of the total warm-up time before the competition).

It should be noted that in more detail the content of kinesiological modules of various target orientation was considered by us earlier [3]. Depending

Table 1. Comparative characteristics of the training process of female skiers in the experimental and control groups (EG - 20 people; CG - 20 people)

| Part of the training | Duration of the training part | CG (n=20 people) | EG (n =20 people) |
|----------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Preparatory (warm-up) | up to 35 min | A set of general developmental exercises - 20 min; stretching - 15 min | Stretching - 15 min; kinesiology exercises for the warm-up part of the lesson - 20 min |
| Main (load part of the workout) | from 45 to 120 min | Complex of general physical training, special physical training - 30 min; uniform or intense training work, depending on the goals and objectives of the training (cross-country, cross-imitation, skiing or roller skiing) - from 60 to 90 minutes | Kinesiology exercises for the main part of the lesson - 30 min; a complex of general physical training, special physical training - 15 min; uniform or intense training work, depending on the goals and objectives of the training (cross-country, cross-imitation, skiing or roller skiing) - from 60 to 90 minutes |
| Final (hitch) | from 15 to 30 min | Stretching - 15-30 min | Kinesiology exercises for the final part of the lesson - 15 min; stretching - 15 min |
| Warm-up (before the competition) | from 35 to 50 min | A set of general developmental exercises - 10 minutes, running at a low pace or skiing, roller skiing in the first pulse zone of intensity - 25-30 minutes; stretching - 10 min | Kinesiology exercises for the formation of a state of combat readiness - 15 min; running at a low pace or skiing, roller skiing in the first pulse intensity zone - 25 minutes; A set of general developmental exercises - 10 min |
| Charging | up to 35 min | A set of general developmental exercises - 10 min, running at a low pace for 15-20 minutes; stretching - 10 min | A set of kinesiology exercises for charging - 20 minutes; stretching - 10 min |
| Day off from training | up to 30 min | No training load | A set of kinesiology exercises for charging - 15-20 minutes; stretching - 10 min |



Table 2. Comparative analysis of changes in motor abilities indices of 15-16-year-old female cross-country skiers from the EG and CG before and after the pedagogical experiment

| Test | Experiment stage | Control group | | | | | Experimental group | | | | | p |
|---------------------------------------------------------------------------|-----------------------|---------------|-------|----------|-------|------|--------------------|-------|----------|-------|------|------|
| | | \bar{X} | \pm | σ | \pm | m | \bar{X} | \pm | σ | \pm | m | |
| Running at 60 m (s) | Before the experiment | 11,1 | \pm | 1,8 | \pm | 0,03 | 11,5 | \pm | 2,1 | \pm | 0,03 | 0,7 |
| | After the experiment | 11,0 | \pm | 2,1 | \pm | 0,03 | 10,3 | \pm | 1,7 | \pm | 0,03 | 0,04 |
| | <i>p</i> | 0,2 | | | | | 0,03 | | | | | |
| Flexion and extension of the arms in the prone position (number of times) | Before the experiment | 32 | \pm | 8 | \pm | 1 | 33 | \pm | 9 | \pm | 1 | 0,8 |
| | After the experiment | 34 | \pm | 6 | \pm | 1 | 46 | \pm | 7 | \pm | 1 | 0,03 |
| | <i>p</i> | 0,4 | | | | | 0,02 | | | | | |
| Lifting the body from a supine position in 30 s (number of times) | Before the experiment | 18 | \pm | 5 | \pm | 1 | 17 | \pm | 3 | \pm | 1 | 0,5 |
| | After the experiment | 20 | \pm | 4 | \pm | 1 | 26 | \pm | 4 | \pm | 1 | 0,03 |
| | <i>p</i> | 0,3 | | | | | 0,02 | | | | | |
| Forward bend from a standing position with straightened legs (cm) | Before the experiment | 9 | \pm | 7 | \pm | 1 | 9 | \pm | 6 | \pm | 1 | 0,9 |
| | After the experiment | 10 | \pm | 4 | \pm | 1 | 16 | \pm | 5 | \pm | 1 | 0,04 |
| | <i>p</i> | 0,3 | | | | | 0,03 | | | | | |
| Standing long jump (cm) | Before the experiment | 181 | \pm | 12 | \pm | 2 | 183 | \pm | 13 | \pm | 3 | 0,8 |
| | After the experiment | 189 | \pm | 5 | \pm | 1 | 191 | \pm | 6 | \pm | 1 | 0,7 |
| | <i>p</i> | 0,04 | | | | | 0,04 | | | | | |
| Throwing a ball 0.3 kg for a distance (m) | Before the experiment | 27,7 | \pm | 7,4 | \pm | 0,8 | 28,1 | \pm | 8,1 | \pm | 0,9 | 0,6 |
| | After the experiment | 28,1 | \pm | 6,4 | \pm | 0,7 | 37,8 | \pm | 4,5 | \pm | 0,7 | 0,03 |
| | <i>p</i> | 0,4 | | | | | 0,03 | | | | | |
| Cross-country skiing 3000 m Classic style (min, s) | Before the experiment | 13:25 | \pm | 1:27 | \pm | 2,4 | 13:11 | \pm | 1:23 | \pm | 3,3 | 0,5 |
| | After the experiment | 13:20 | \pm | 1:15 | \pm | 3,2 | 11:07 | \pm | 0:45 | \pm | 2,2 | 0,04 |
| | <i>p</i> | 0,7 | | | | | 0,02 | | | | | |
| Cross-country skiing 5000 m Free style (min, s) | Before the experiment | 19:18 | \pm | 1:33 | \pm | 2,8 | 19:29 | \pm | 1:21 | \pm | 3,4 | 0,4 |
| | After the experiment | 18:10 | \pm | 0:55 | \pm | 2,9 | 17:13 | \pm | 0:42 | \pm | 3,1 | 0,03 |
| | <i>p</i> | 0,03 | | | | | 0,01 | | | | | |
| Ski expander 3 min (number of movements) | Before the experiment | 38 | \pm | 5 | \pm | 1 | 37 | \pm | 6 | \pm | 1 | 0,5 |
| | After the experiment | 41 | \pm | 4 | \pm | 1 | 50 | \pm | 3 | \pm | 1 | 0,04 |
| | <i>p</i> | 0,4 | | | | | 0,02 | | | | | |

on the period of preparation, the goals and objectives of a particular training session, one or another kinesiology module was used. A pedagogical experiment to determine the effectiveness of the use of kinesiology modules in the training process of cross-country skiers aged 15-16 was carried out for one year (annual training cycle). Distinctive features of the training process of the participants in the experiment are presented in Table 1.

Conclusions. In conclusion, it can be noted that in the experimental group there is a significant improvement in motor fitness indicators in most of the

tested physical qualities of female athletes (Table 2), which may indicate the effectiveness of the use of kinesiology modules in the training process of 15-16-year-old cross-country skiers.

References

1. Balsevich V.K. Stimuliruyemoye razvitiye kinезiologicheskogo potentsiala cheloveka [Stimulated development of human kinesiological potential]. *Kultura fizicheskaya i zdorovye*. 2013. No. 5 (47). pp. 7-9.



2. Golovko D.E., Zagrevskaya A.I. Kineziologicheskii potentsial sportsmenov kak faktor upravleniya trenirovochnym protsessom [Kinesiology potential of athletes as a factor of training process control]. *Teoriya i praktika fizicheskoy kultury*. 2019. No. 11. pp. 80-82.
3. Golovko D.E. Vliyaniye kineziologicheskogo modulya «Psikhoemotsionalnyye vspleski» na psikhomotornuyu podgotovlennost lyzhnikov-gonshchikov [Influence of the kinesiology module “Psycho-emotional bursts” on the psychomotor readiness of racers]. *Teoriya i praktika fizicheskoy kultury*. 2020. No. 11. pp. 22-24.
4. Sosunovsky V.S., Zagrebskaya A.I. Kineziologicheskaya obrazovatel'naya tekhnologiya fizicheskogo vospitaniya doshkolnikov [Kinesiology educational technology of physical education of preschoolers]. *Teoriya i praktika fizicheskoy kultury*. 2020. No. 11. pp. 68-70.