



## ASSESS MINERS' COORDINATION ABILITIES, KEEP BODY BALANCE, AND VESTIBULAR SENSOR SYSTEM

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**Abstract:** Is this article highlighter data from an experiment conducted to develop the coordination skills of miners. In the work process studied the number of mistakes made by miners and given to correct exercises. As a result, the number of errors has decreased significantly, and this has a positive effect on the work of miners. Indicators were  $R < 0.05$  validity.

**Keywords:** Coordination movements, body balance, vestibular analyzer, miner's activity, complex exercises, physical training.

## KONCHILAR KOORDINATSION QOBILIYATI DARAJASINI BAHOLASH, TANA MUVOZANATI VA VESTIBULYAR SENSOR TIZIMNI SAQLAB QOLISH

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Jismoniy tarbiya va sport bo'yicha mutaxassislarni qayta tayyorlash va malakasini oshirish instituti  
"Jismoniy tarbiya, sport nazariyasi va uslubiyati kefedrasi" mudiri, p.f.n., professor

**Annotatsiya:** Ushbu maqolada konchilarni koordinatsion qobiliyatlarini rivojlantirish uchun olib borilgan tajribadan ma'lumotlar keltirilgan. Konchilarning ish jarayonida qiladigan xatolar soni o'rganilib, ularni tuzatish uchun mashqlar berildi. Natijada xatolar soni anchaga kamaydi va bu konchilarning ish faoliyatiga ijobiy ta'sir ko'rsatdi. Ko'rsatkichlar  $R < 0,05$  haqiqiylikni tashkil qildi.

**Kalit so'zlar:** Koordinatsion harakatlar, tana muvozanati, vestibulyar analizator, konchilar faoliyati, murakkab mashqlar, jismoniy tayyorgarlik.

**Аннотация:** в статье представлены результаты проведенного эксперимента по развитию координационных способностей горняков. Выявлены и изучены ошибки, допущенные горняками в процессе работы. Даны упражнения и рекомендации по их исправлению. В результате количество ошибок значительно снизилось, повысился уровень координационных способностей горняков, что в свое время положительно сказалось на работе шахтёров ( $R < 0,05$ ).

A study of the development of coordination movements of miners of various professions shows that, despite the good knowledge of work movements (miners with 10 and more years of work experience), a large number of errors are observed in movements (from 22 to 50). This is explained by the well-developed vestibular analyzers, which form and control many tasks of motor activity (body balance, clear aim, performing complex coordinated movements in various situations, etc.).



As all underground work involves frequent changes in working conditions (standing, crouching, sitting), posture retention is the result of a constantly-adjusted moving mechanism.

If state reactions are included in complex coordinated polystructural movements, they are a component of the program of moving actions (Verkhoshansky 1988), but the number of different mining work situations is so large that among them, economical, convenient, special, efficient and individual it is advisable to choose the one that is worked on, because in the process of maintaining a comfortable position, the level of freedom, correction and control of movement parameters determined by the mobility of the joints occurs. These are special factors in accordance with all working conditions, the size of the base area, the determination of the magnitude of mechanical influence from the outside, creating a large angle of balance in the required direction, changing the working position relative to the base area (general center of gravity, location, terrain, mobile and stationary). Allows coordination in joints depending on the base change.

When the body comes to an initial, comfortable position, there is a return, vibration movement (equilibrium). The higher the skill of the worker in this (passers, explosives, fasteners), the body vibration decreases and the time to maintain complex balance increases.

Maintaining body balance in different professions takes different forms and is trained differently, and it is easier to divide them into groups according to the following directions:

→ exercises in changing situations (quick walking, lying down, standing, bending, turning, etc.);

→ exercises performed in complex conditions of a changing environment (crawling in different directions - climbing up, sideways, moving and stationary supports, climbing stairs, anchors, obstacles);

→ exercises performed in variable resistance (exercises similar to martial arts, etc.);

→ exercises with objects (throwing various objects, catching them, throwing them at a target and at a distance, etc.);

→ in several sections, exercises requiring the help of partners, etc.;

→ body exercises that require cooperation and countermovement of partners (hanging a ball that bounces from the floor or wall);

→ body balance when performing various movements on a limited support area, maintaining body balance in difficult conditions, maintaining balance when jumping, falling to the ground, coordinating different bodies; climbing a hill with a deviation angle of 10-150 using various safety devices.

This complex set of exercises forms the ability not to rush when the environment suddenly changes, to take the correct aim in the distance, to know how to distribute the movements correctly.

### A set of tools to improve body balance in passing, explosive, strengthening.

T/r	Content of exercises.	Methodological notes
1	Walk with appropriate hand movements for each step (forward, sideways, up, down, forward, down-back	Different options can be used by alternating arms and legs.
2	Counting from the right hand to 16, alternately put the hands on the waist and shoulders, raise them up, and after clapping, return to the previous position by clapping twice. Same move, jump.	

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3	Falling forward in a semi-sitting position and lifting the right leg up. Clapping with hands, turning to 1800 to perform the exercise on the other side, standing up,	The same exercise, only lying on the back with the shoulders, turn to 1800, clap and return to the starting position.
4	With legs spread, throwing a small ball from right hand to left hand, raising the ball from under the knee, behind the shoulder, throwing the ball and turning 1800, 3600, 7200, hands on the shoulders , hanging the ball on the waist, flat on the floor.	Perform the exercise alternately on the right and left sides.
5	Standing on a rope or an anchor with the front side (at a distance of 1-1.5 meters), jump and hang on the rope and stand in place while looking forward without jumping (3600 back turns).	Bending the legs, stooping and performing other movements in flight.
6	Standing in front of the stairs, holding the ladder with the hands, moving along the top of the ladder with the help of arms and legs, performing the same movement while hanging on the ladder with the hands	Using any convenient combination
7	Stand in front of a low bar with your front and grab it. Sticking feet on a horizontal hanging ladder, moving up and down the ladder manually	
8	Standing at the end of the pole, sitting, turning on the toes, half-sitting, walking, running, returning to the starting position	Independently different status; invent hand movements.
9	Stand facing the wall at a distance of 2-2.5 meters with the legs spread, the ball in front of the chest. Throwing the ball, rolling over the shoulder and catching. The same, squatting and pulling up while rolling one leg to the side and back	





10	Moving along a limited support with a load on the shoulders is the same exercise, over obstacles.	
11	Sitting with another load, keeping balance with the hands	
12	Feet shoulder-width apart, jumping towards a small ball with the front side, pushing the ball to the field, feet shoulder-width apart, maintaining balance with arms, legs, body, the same exercise, half-sitting, turning.	They can be played while holding the equipment (stick, ball) in the hand or head (this exercise is intended for beginners and strengtheners).
13	Exit while balancing with hand on barrel Move straight while balancing on a rolling barrel. The same exercise back to front, jumping 1800 turns	Hands with bodies to the side, up, forward, back.
14	Touching the pole with the hand, pressing the ball next to it with the foot, swinging the legs to climb on the ball. Sitting and standing, turning 900 to different sides, 1800	Hands to the side, up. (for reinforcement, electrifiers, explosives).

Using this set of exercises, it is necessary to learn the ability to accurately perform the speed-force and width-time dimensions of movements and to change the direction, it is necessary to be able to use signs of light and sound movements. They will be simple and understandable (counting, clapping, language forms of signs (okay, come on, stop, etc.), hand gestures, nods). These signs are important when working underground, where miners communicate more with gestures than with words.

We studied the ability of miners to maintain balance (according to AIYarosky's experiment) using the method of head rotation. As a result, climbers have a very low level of body balance after a head-spin,  $+2.8$  when the heart rate is 172-184 beats per minute.  $\pm$  is 3.4. Even in passers and blasters who need to have a complex set of movements, vestibular testing  $x= 8.5\pm 2.0$  and  $x=9.36\pm$  It was 1.4. Usually, turning the head caused loss of balance, dizziness, pale face, rapid breathing, increased pulse, and sometimes dizziness. Practicing the vestibular analyzer daily with the help of the set of exercises listed below will increase functional ability and the level of maintaining body balance in explosives  $x=10.2\pm 1.92$  in passers  $x=9.2\pm 2.48$  in mountain workers  $x=3.7\pm$  It allowed to reach 1.6.

Summarizing the above, it was found that after the training, the exercises carried out to restore the balance of the mine workers gave creative results.



## Dynamics of activity of vestibular analyzers of miners of all professions on the example of 25-30-year-olds (5-7 years of work experience).

Type of activity	Mathematical significance	Moving the head in a circular motion with the eyes closed		One leg in front, the other behind, hands at the sides, keeping the balance of the body.		Acrobatics, hip hop (forward), turn 3600, postvestibular target on target (seconds)	
		Until training	After training	Up to training	After training	Up to training	After training
<i>Passersby</i>	X	8.5	9.2	10.2	19	2	1.09
	6	2.0	2.48	3.45	3.09	2.38	1.2
	R	<0.05		<0.05		<0.05	
<i>Explosives</i>	X	9.36	10.27	12.8	14.7	2.3	2.1
	6	1.4	1.92	5.25	7.27	0.92	2.84
	R	<0.05		<0.01		<0.05	
<i>Mountain masters</i>	X	6.4	7.2	5.3	7.2	4.7	3.2
	6	2.46	2.0	3.2	2.6	1.8	2.6
	R	<0.05		<0.05		<0.05	
<i>Mountain workers</i>	X	2.8	3.7	4.8	6.2	4.2	4.0
	6	3.4	1.6	3.4	2.6	3.7	2.6
	R	<0.05		<0.05		<0.05	

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