

ANALYSIS OF KINEMATIC MOVEMENT POSSIBILITIES OF PARA ATHLETICS

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Abstract: This article analyzes the ability of Paralympic athletes to adapt to the loads of the annual training cycle and to restore the sports form on the basis of the kinematic description of the athletes' nosological condition. The highest levels of training were also identified through special exercises in the laboratory. Based on the results of the study, proposals and recommendations on changes that need to be made at different stages of training of paralympians have been developed.

Keywords: cyclic and acyclic sports, cerebral palsy, amplitude, speed, descriptions, kinematic activity, body balance, the ability to delay and accelerate, the athlete's reactive power, the complexity of the trajectory, the force of impact.

АНАЛИЗ КИНЕМАТИЧЕСКИХ ДВИГАТЕЛЬНЫХ ВОЗМОЖНОСТЕЙ ПАРА СПОРТСМЕНОВ

Аннотация: В данной статье анализируются основные кинематические характеристики спортсменов по состоянию нозологии и возможностей адаптации к нагрузкам и восстановления спортивной формы в годовом тренировочном цикле спортсменов-паралимпийцев. Поэтому, определены самые высокие показатели по средствам подготовки специальных упражнений в условиях лаборатории.

По результатам проведенного исследования разработаны предложения и о изменениях, которые должны быть включены в различные этапы подготовки пара спортсменов.

Ключевые слова: циклические и ациклические виды спорта, детский церебральный паралич, амплитуда, скорость, рекомендации, кинематическая двигательная активность, взаимная пропорциональность частей туловища, возможность задержки и ускорения, реактивная мощность спортсмена, сложность формы травмы, интенсивность воздействия на сила.

INTRODUCTION

Adaptive physical training tools have such an effect that they show a healing effect only when used correctly. Exercising without a thorough study of a person's ability to move not only negatively affects the outcome of the sport, but also leads to a deterioration of the athlete's daily physical activity. [3,4,5,6,11,12], taking into account physical fitness and biological properties is important. Pedagogical supervision, based on regular laboratory conditions, involves the strict regulation of these features in a comprehensive manner. It should be borne in mind that neither the educator who has trained many champions nor the practitioners themselves may be able to fully and timely identify the changes that occur under the influence of exercise. [1,2,7,8,9,10]

We examined the ability and readiness of paralympic participants to participate in cyclic and acyclic sports. The possibility of changing the position of the body and the ratio of its parts to each other during the performance of many exercises was studied. The importance of the initial state in the performance of the work is very important in order to achieve a certain anatomical-

physiological effect. We conducted research in a laboratory setting that identifies key indicators of programmed training to determine the effectiveness of actions using innovative technologies.

MAIN PART

With the change of body position during movement, the direction of the dynamic base reaction and the acceleration possibilities favorable for the conditions of this direction were examined at different times of preparation. These indicators, firstly, allow people with various injuries in cerebral palsy to get accurate and fast information about the possibilities of movement, and on the other hand, make changes in the direction and content of training in preparation.

During exercise, the weight of the athlete's body, the strength of the base reactions, the indicators of overcoming the resistance forces associated with the external environment. Any movement activity of a person can be considered as the use of the gravitational force of a muscle in conjunction with other external and internal forces. In practical work, generalized qualitative descriptions that comprehensively reflect several indicators of movement are widely used. They can be divided into the following groups:

- a) correct actions are actions that correspond to the task of movement and the conditions of its solution according to the direction, amplitude, velocity and other characteristics;
- b) misconduct - actions that are incompatible with the tasks of the action, albeit partially;
- c) useful actions - the actions necessary to achieve the goal;
- d) useless movements are movements performed with excessive unnecessary effort of the muscle;
- e) sudden movements - explained by an increase in strength and speed;
- f) sluggish movements - defined by actions opposite to sharp movements.

The athlete under study is involved in the running type of athletics and has seven years of athletic experience. Through this study, the possibilities of acyclic exercise in cyclists were studied. In each acyclic movement, it is important to have three phases in accordance with their functions in the whole act: preparing to perform the action, performing the main action at the required amplitude, and clearly defining the final phases. All three of these phases are interconnected, performed together, and always require each other.

In individuals with various injuries in cerebral palsy While the potential for developing explosive power skills is complex, the level of development of this ability in cyclical sports is of particular importance. In the squat up test, the reactive force of the leg was determined.

Reactive forces are forces that are reflected in the process of accelerated motion during the interaction of body parts. Therefore, determining the proportions of the body parts when performing a particular movement is the basis for improving the athlete's results.

In this test, the kinematics of the optimal height of the leg muscle tone, which allows to perform the best vertical jump, were studied. A jump test as high as possible while sitting at 90° was used. In cyclical sports, these figures ranged from 8.9 cm to 11.3 cm in an athlete who was tested for mobility in one leg and one arm. It should be noted that this result in 3 months of the preparatory phase has growth dynamics, but at the same time does not show a high growth rate.

One of the main characteristics of motion kinematics is determined by the ability of acceleration and tension relative to the performance of an activity. The acceleration capacity of this athlete ranged from 18.7 m / s² to 19.8 m / s².

Through this coordinate, we have shown the level of training of our athletes as a guide to coaches on training gaps and how to overcome them, based on accurate data on many functions.

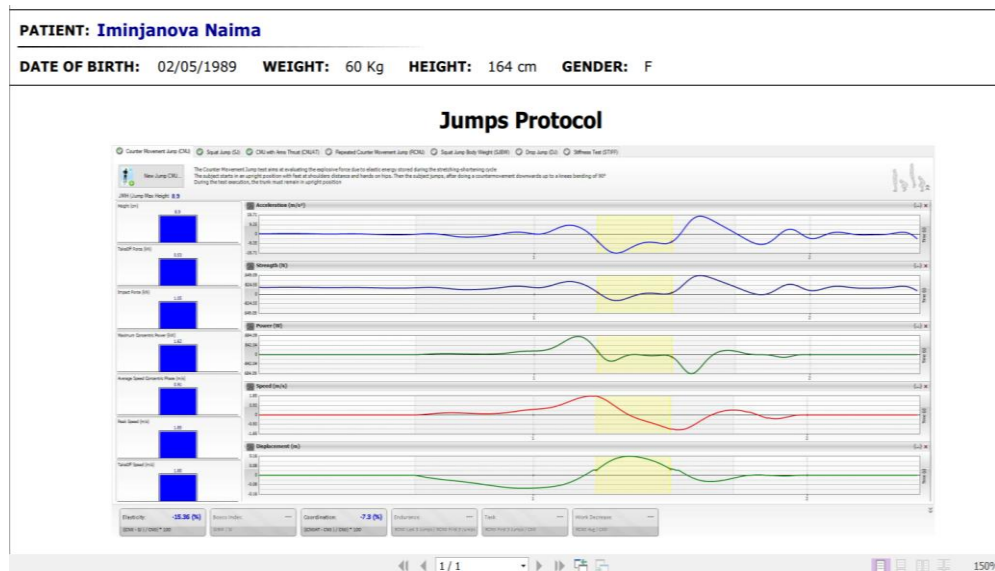


Figure 1. Kinematic movement activity of Naima Iminjonova, parasport (athletics).

The leg muscle tension along the second coordinate axis was 0.53 (kN) during the training period in this athlete. On the nosology of one arm and one leg of the cerebral hemispheres, this indicated result is slightly lower than the mean values. Studies in this nosology have shown high results in leg muscle strength opportunities in cyclic sports, mainly in paravelosport and paraengilic long jump. One of the most noteworthy aspects is that the highest results in many athletes are mainly due to the 4-6 mesocycles of training. During the main competition, these figures are 12-14% lower than in the preparation period. Of course, these figures will affect the outcome of the competition.

The impact voltage on this particular exercise was 1.05 (kN). Even the worst results on this indicator are mainly due to the competition period. These indications are due to the strong tension of the leg muscle tension close to the main races. These results suggest that while one-handed and one-leg nosology requires different changes to a separate training program for the athlete on the one hand, there are some problems in creating recovery and muscle relaxation exercises after training to improve strength quality on the other.

The maximum concentrated power index ranged from 1.62 (kW) to 1.73 (kW). This indicator is very important in all sports, especially in cyclical sports, where the results in the main competitions are often very short, and the chances of winning in athletes with a high level of sports technique are directly related to the level of development of this indicator. Depending on how high the maximum concentrated force is, the athlete's prospects can be determined. The forces that affect the movement of the human body are divided into internal and external forces. While the passive forces of the musculoskeletal system are determined by the elastic strength and elongation of the muscles, the active forces of the musculoskeletal system are determined by the gravitational force of the muscles. In the nosologies associated with cerebral palsy of the musculoskeletal system, the force of gravity of the muscles is one of the most important links.

In the high jump, the average concentric force index ranges from 0.91 to 0.98 (m / s). This suggests that with this athlete, coaches need to pay more attention to speed-strength training on a monthly training cycle.

The upward jump rate also showed a result of 1.85 to 1.96 (m / s). In analyzing these indicators, of course, the approach should be based on the athlete's weekly microcycle tasks. This

is because the jumping speed showed a relatively lower result after training, which was mainly designed for leg muscle strength. When analyzing the kinematic capabilities of the athlete, it is necessary to take into account the direction of the load performed in training and the mode of work. Reactive forces also play an important role in the analysis of an athlete's dynamic characteristics. Reactive forces are understood to be forces during the interaction of body parts in the process of accelerated motion.

In this athlete, the vertical flight speed also showed a result of 1.85 to 1.92 (m / s) in terms of kinematic capacity. The generalized concept of forces of motion is used to describe the forces of action in action. The qualitative characteristics of human movements are so diverse that they can be conditionally divided into actions that are springy, explosive, semi-forceful, and loose. We have analyzed the explosive power capabilities that require precise speed-power.

It is in this nosology that the kinematic possibilities of boys engaged in cyclic sports have also been studied. Often, the continuity of movement is seen when the exercises are performed technically correctly. When performing a particular movement, one group of muscles must be performed in a sequence in which the other muscle group begins to move before the work is completed. However, subsequent actions require increasing speed. If each force is affected from the point where the maximum speed of the movement caused by the action of the previous force is reached, the speed of the next movement is gradually increased.



Figure 2. Kinematic movement activity of Agzamov Umidjon, parasport (track and field).

with various cerebral palsy, in practice, the way to increase the speed of exercise is more or less related to the morphological features of the body links. It is therefore necessary to strive to reduce the exposure time of muscle strength when the path of increasing speed is limited. In the squat jump test, along with the athlete's reactive power, the balance of the body's performance system is also important. The shorter the exposure time of the force relative to the motion performed on this path, the higher the velocity of the motion.

In cyclical sports, these figures averaged 21.6 cm in the vertical jump height of one leg and one arm, while the best result was in the pre-race stage of training (23.9 cm) and the worst result was in the first stage of training (18.7 cm).) was correct. It should be noted that the results from 2 months of the preparatory phase showed growth dynamics but at the same time did not show a high growth rate.

Acceleration capacity in this athlete ranged from 16.8 m / s² to 21.2 m / s². Basically, the growth rates coincided with the development of flexibility and agility in the mesocycles.

The leg muscle tension along the second coordinate axis ranged from 1.06 (kN) to 1.12 (kN) in this athlete during training. On the nosology of one arm and one leg of the cerebral hemispheres, this indicated result is closer to moderate developmental indicators.

It was found that the impact stress on the force increased from 0.94 (kN) to 1.16 (kN) in relation to this particular exercise.

The maximum concentrated power index was initially 1.48 (kW) at the beginning of the study, but during the study, these values ranged from 2.14 (kW) to 2.23 (kW). This figure has a direct impact on results in major competitions, even in cyclical sports. Changing the direction of dynamic base reactions by changing the position of the body during movement can therefore give the body an acceleration that is favorable for the conditions of this direction. Examples of this are short and long distances from cyclic sports, standing positions in acyclic sports, and different levels of posture during the depressive phases of running and long jump.

In the high jump, the average concentric force index ranges from 0.91 to 0.99 (m / s). This suggests that the athlete's average concentric strength performance did not yield a positive result even at different stages of training.

The upward jump rate also showed a result of 1.66 to 1.93 (m / s). In analyzing these indicators, of course, the approach should be based on the athlete's severe nosological condition. It also places special demands on the general condition and the condition of certain parts of the body in some types of exercise. These requirements are assessed not only by the biomechanical expediency of the exercise, but also by the accuracy of the posture, consistency of movements, beautiful performance.

In this athlete, the vertical flight speed also showed a result of 1.59 to 1.83 (m / s) in terms of kinematic capacity. These figures also show that high growth rates were not observed in the results of research conducted at the initial and different stages of training of the athlete.

Most of the errors in posture or movements that meet the requirements of anatomical-physiological and technical efficiency in sports practice are due to insufficient consideration of the effect of neck-strengthening reflexes resulting from changes in head position relative to posture.

Through this exercise, we studied not only the activity of parastists on their kinematic capabilities, but also provided a basis for drawing general conclusions about its preparation at different stages of training and movement during the competition and the transition period. The proposed special exercise was also evaluated with different weights according to the athlete's ability.

The diversity of the trajectory shape of active movements is mainly determined by the development of nerve centers that strengthen a particular part of the body. The complexity of the trajectory shape also depends on the moving part of the body. The larger this part, the simpler its shape will be, and vice versa. We have therefore complicated the movements performed by these athletes. This is because athletes often have to compete in difficult conditions during competitions.

In nosology of one leg and one arm, the ability to pull and relax muscles is more complicated in athletes with a brain-dependent condition. The vertical jump height of this athlete with the weighted load averaged 21.6 cm. This result shows that the athlete's ability to jump high has developed steadily. The fact that the results of his first jump with a load are close to the results of a jump performed without any load also proves our point. The athlete's best result came during the competition period (22.1 cm).

The leg muscle tension along the second coordinate axis ranged from 0.92 (kN) to 1.03 (kN) in this athlete during training.

It was found that the impact voltage on the force increased from 0.50 (kN) to 0.84 (kN) in relation to this particular exercise. On the nosology of one arm and one leg of the cerebral hemispheres, this indicated result is closer to moderate developmental indicators.

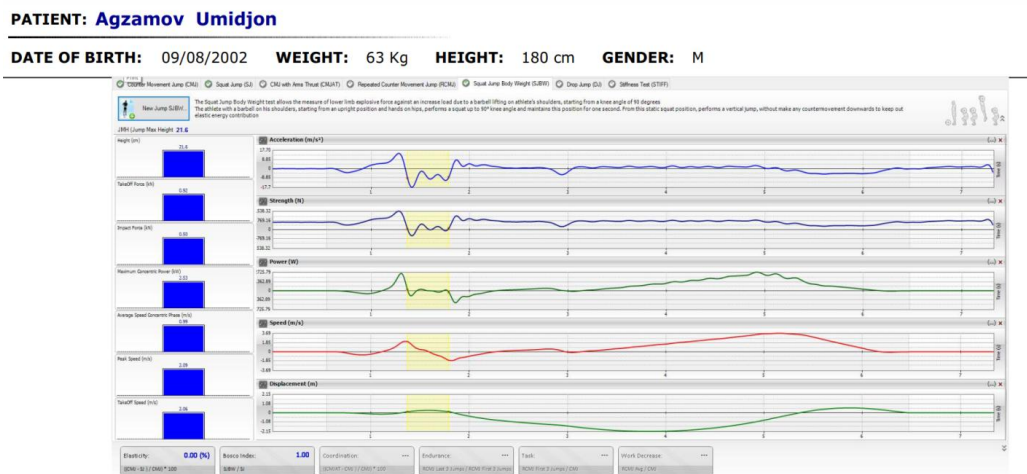


Figure 3.

Paralympic (track and field) Agzamov Umidjon's cinematic movement with different weights.

While the maximum concentrated power index was initially 2.14 (kW) at the beginning of the study, during the study, these values ranged from 2.53 (kW) to 2.62 (kW). The eye often plays an important role in spatial orientation in controlling directions of motion. Therefore, in large and rapid changes in the direction of movement, the movement of the head usually precedes the movement of other parts of the body.

In the high jump, the average concentric force index ranges from 0.99 to 0.95 (m / s). The effectiveness of the effect of this exercise on the body of the trainee and the success of the technique depends on how well the moving body and its parts are directed.

The upward jump rate also showed a result of 2.02 to 2.09 (m / s). In this athlete, the vertical flight speed also showed a result of 1.96 to 2.06 (m / s) in terms of kinematic capacity. The results of research conducted at different stages of the athlete's initial and training after exercise with a load show that no high growth rates were observed.

We conducted these studies not only in preparation for major competitions and in a competitive environment, but also as an analysis of the ability of muscle performance patterns and movement qualities to maintain their activity at different stages of the transition period as one of our main challenges. These results not only showed the condition of the athlete during the training period, but also the extent to which the selected exercise in the transition period was appropriate. The study found that even during the transition period from cycling to track and field, athletes maintained an average level of explosive power compared to other sports.

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