# CONTROL OVER THE EFFECTIVENESS OF THE THROWING TECHNIQUE IN THE JUMP OF QUALIFIED HANDBALL PLAYERS

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**Abstract:** this article describes the methodology for controlling the effectiveness of the throwing technique of qualified handball players in jumping, in addition to the data on the speed of the ball, the height of the jump when performing a number of handball techniques.

**Keyword:** handball, highly qualified, athletes, physical qualities, jumping, technique, throwing, efficiency.

# КОНТРОЛЬ ЗА ЭФФЕКТИВНОСТЬЮ ТЕХНИКИ БРОСКА В ПРЫЖКЕ КВАЛИФИЦИРОВАННЫХ ГАНДБОЛИСТОВ

**Аннотация:** в данной статье описывается методика контроля эффективности техники броска квалифицированных гандболистов в прыжках, в дополнение к данным о скорости полета мяча, высоте прыжка при выполнении ряда гандбольных приемов.

**Ключевое слово:** гандбол, высококвалифицированные спортсмены, физические качества, прыжки, техника, метание, эффективность.

## INTRODUCTION

Relevance of the topic. Currently, the leading importance is given to the scientific justification of the process of improving highly qualified athletes and the development of effective methods of managing the educational process. In order to effectively manage the learning process, information is needed about quantitative indicators and a qualitative analysis of the relationship of various characteristics of the motor actions. Among the most pressing issues of preparing athletes for sports games is the control of technical and tactical skills, the level of which largely determines the result of competitive activities. For the successful improvement of technology, it is important to determine the criteria by which their level of technical skill can be assessed.

In modern handball, the strength and accuracy of shots towards the goal has increased significantly with an increase in the speed of the game. Therefore, there was a need to deeply study the structure of throwing and develop new technologies to improve the technical training of handball players. This, in turn, makes requirements for the development of training programs, taking into account the individual level of mastering the shooting technique and the qualities of the tool implemented in it. The construction of movements when throwing a jump is characterized by significant complexity, therefore, the pedagogical process of improvement takes a long time. In this regard, one of the pressing problems of modern handball is the optimization of the process of improving handball shooting based on the study of its biomechanical structure. Studies in this direction are of great practical importance, since they meet the requirements of sports practice.

## MATERIALS AND METHODS

**Literature analysis the work** of specialists in the general theory of sports V. K. Balsevich, Yu.V. Verkhoshansky, Yu.K. Gaverdovsky, L. P. Matveev, V. P. Platonov, etc. Sports biomechanics specialists D. D. Donskoy, M. A. Godik, W. M. Zasiorsky, G. I. Popov, N. G. Suchilin, A. A. Shalmanov et al. handball specialists A. A. Akramova, A. G. Danilova, S. I. Dorokhova, V. Ya. Ignatieva, I. V. Petracheva, V. I. Tkhoreva, etc.

**The object of study** is the process of technical training of handball players of various qualifications.

**The purpose of the study** is to assess the effectiveness of the handball shooting technique in jumping and to experimentally test the methodology for its improvement.

**Main part.** Jumping is a complex technical technique consisting of several elements in a row: running, pushing, swinging and kicking, flying, swinging, acceleration of the hand with the ball, emptying the ball and landing are lowered.

Biomechanical analysis of the technique of handball shooting in the jump made it possible to determine that the speed of leaving the ball is provided by a strict sequence of work of individual links of the hand, with an increase in speed with a wave-like character. The output speed of the ball reached 23.54 M / s. the horizontal speed of the hand ties had the highest values, at the wrist joint - 12.09 M/s, at the elbow – 10.42 M/s, at the shoulder – 3.98 m/s. The vertical velocities had fewer values and were 5.05, 4.15, 2.46 m/s, respectively, and the velocities along the frontal Axis had values of 3.79, 5.33, 2.08 m/s.

One of the indicators of the effectiveness of the shooting technique is the successive expansion of the lower limbs with a multidirectional change in the corners of the hip and knee joints during the transition from swallowing to pushing. When the foot was placed on the support, the angle of inclination of the knee joint of the push foot was 145º, with depreciation it decreased by 116º and the angle at the hip joint increased by 134º. high-efficiency use of the lower leg joints is observed in coincidence during upward movement. the flywheel Movement connects with the flexion of the knee joint of the push foot at the end of depreciation. The maximum value of Flexion in the knee joint of the push foot was up to 53º for maximum flexion in the knee joint of the fly foot .

Indicators of the comparative effectiveness of the shooting technique are the maximum values of the initial speed of leaving the ball and the speed of the links of the shooting hand. For the handball players of the Russian team, the average horizontal speed of the ball was 17.13 M/S, and for the players of the super League-only 13.84 M/s ($p<0.05$). Russian team players have the maximum values of the horizontal speed of all the joints of the hand involved in shooting, high (shoulder joint speed - 3.98 m / s, elbow – 8.20 m / s, wrist – 11.36 M / s) team than super League players (respectively – 2.84, 6.61, 8.76 m / s). The team's second offensive line players have the highest rushing performance.

Discriminative indicators of the shooting technique are the maximum values of the horizontal and vertical speed of the knee joint of the flywheel leg when performing a push. The average values of the vertical speed of the flywheel leg of national team handball players were 3.81 m/s, super League – 2.77 m/s, national team handball players horizontal speed – 4.10 m/s and super League - 3.07 m / s/.s ($p<0.05$).

Analysis of the relationship between the speed of flight of the ball and the kinematic characteristics of the shooting technique confirmed the importance of the active installation of the push foot, the optimal depth of leg flexion during depreciation, the wide amplitude of movement and increasing vertical speed. flywheel leg while performing the shot. The closest relationship between the departure speed of the ball is observed by the maximum values of the horizontal speed of the hand ties in the final movements. The correlation coefficient with the maximum speed of the wrist joint was 0.82, elbow–0.67, shoulder– 0.59 ($p<0.05$). The maximum value of the vertical speed of the knee joint of the flywheel leg is related to the length of the last running step ($R=0.62$) and the maximum value of the horizontal speed of the knee joint of the flywheel leg ($R=0.68$).

The speed of leaving the ball is mainly determined by the speed of the handball players and the level of strength training. The speed of the ball has a high affinity with the results of throwing a 1 kg ball from the Spot (r = 0.89), triple jump (R= 0.88) and standing Strength Index (R= 0.82). To control the technique, the coaches developed tables for assessing the effectiveness of the shooting technique in the jump based on the results of throwing a 1 kg ball during the training process and the speed of the ball's departure when throwing in the supporting position.

The players of the national team had the highest motor potential and demonstrated the highest indicators of implementation efficiency, and the participants of the pedagogical experiment, handball players of the Luch Super League team, had low efficiency for athletes of such a level. The use of specially developed pedagogical programs in the pedagogical experiment eliminated the identified individual shortcomings of the technique, as a result of which the level of abandonment of the ball and the level of implementation efficiency increased.

**CONCLUSIONS**

**Conclusion** research on the kinematic mechanisms of jumping throwing has made it possible to formulate the pedagogical requirements necessary to teach and improve throwing: to perform shooting at an optimal flight speed; place the pulling leg on the support with an optimal angle of inclination at the knee joint; carry out an active expansion of throwing. pressing straighten the leg and trunk; perform a quick swing with the leg up. When performing push-ups and rocking movements, special attention should be paid to special exercises aimed at improving the movement of the legs.

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