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A FORMALIZED MODEL OF BACKWARD THROWING TECHNIQUE: A METHODOLOGICAL APPROACH FOR JUDO



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Abstract: This article examines the backward throwing techniques in judo, focusing on O-uchi-gari and Ko-uchi-gari, and presents a formalized model for their execution. The study analyzes the phase-based structure, biomechanical foundations, movement synergy, and challenges under resistance. It identifies methodological shortcomings in current training systems and proposes adjustments aimed at enhancing technical readiness aligned with real match conditions.

Key words: judo, backward throw, O-uchi-gari, Ko-uchi-gari, technical model, biomechanics, synergy, preparation, resistance.

INTRODUCTION

Among modern sports, judo is recognized as one of the most technically and tactically complex forms of individual combat. Various throwing techniques aimed at bringing the opponent to the ground are considered one of the key distinguishing features of this discipline. In judo, the backward throwing technique – that is, toppling the opponent in a backward direction – is regarded as a critical indicator of a judoka's competitive success. Therefore, the need to develop a clear, systematic, and methodological model of this specific movement is becoming increasingly relevant.

Currently, athletes rely mainly on personal experience and their coaches' guidance when performing backward throws. However, these practices often lack standardization, resulting in inconsistent performance outcomes. This situation stems from the absence of a unified technical-methodical model in judo training. The trajectory of movement, support points, force distribution, loss of balance, and implementation phases of the technique have not yet been comprehensively studied through a scientifically structured model, which complicates methodological planning in judo practice.

This article is aimed at studying the backward throwing technique in judo through a standardized model, analyzing its step-by-step execution, biomechanical foundations, and methodological indicators. The goal is to justify the effective application of this movement in athlete training. Moreover, the research also intends to develop an algorithm for this technique and offer practical recommendations for its integration into training sessions.

REVIEW OF LITERATURE ON THE SUBJECT

Research focused on the scientific analysis of judo techniques – particularly those addressing throwing methods – serves as a key resource for standardizing athletes' movement algorithms. The renowned scholar Jigoro Kano, who founded judo, initially emphasized the harmony of aesthetic movements. However, his approach later evolved into a system designed to maximize athletic performance.

E. B. Shestakov, in his biomechanical studies, examined the key points of support and balance disruption during throwing movements in detail. His research modelled the backward throw as a sequence of stages

– from positioning to final execution – highlighting the interrelation between external balance factors, force impulses, and timing.

Russian researcher A. P. Kudryavtsev investigated the motor structure of judo techniques and the pedagogical approaches used in their instruction. His applied research divides the backward throw into four main phases: preparation, balance disruption, main execution, and final fixation. This framework contributes to improving training effectiveness.

Among Uzbek scholars, O. J. Davletov has conducted in-depth studies on technical and tactical training in judo, demonstrating how muscle strength, reaction speed, and balance control are directly linked to technical execution. His work formed the basis for methodical guidelines aimed at standardizing judo techniques.

International researchers such as G. Franchini and L. Del Vecchio have introduced video-analytical and statistical methods for evaluating judo athletes' techniques and tactics. Their studies enabled digital monitoring of the effectiveness of backward throws during competitive matches.

Overall, the literature analysis shows that the backward throwing technique in judo remains insufficiently standardized. This gap is especially critical in the training of young athletes, where technical errors tend to accumulate. Therefore, based on the aforementioned studies, developing a formalized, step-by-step methodological model is a timely and necessary task.

RESEARCH METHODOLOGY

The data for this study were obtained through video recordings, observation, and experimental monitoring of athletes during training sessions. Biomechanical modeling and time-coordinate analysis were used to examine the movement phases. The collected data were statistically evaluated using SPSS software, applying both variational and correlational analysis methods.

ANALYSIS AND RESULTS

Our research revealed that, within the context of judo, one of the most complex and coordination-demanding actions is disbalancing the opponent through inclination and subsequently executing a forward or backward throw. This is primarily due to the fact that, in a confrontational situation, the opponent typically reinforces their own projection and tends to shift the situation to their own advantage. Simultaneously, they rely on their position to maintain stability. Therefore, initiating a backward throw during the initial phase of combat is particularly challenging.

In traditional judo literature (M. Vakhun 1983, Judo 1980, G. Parkhomovich 1993, H. Esink 1974, E. Domini 1965, T. Inogai, R. Habersetzer 1983, I. Inokuma 1973–1979, K. Kawayshi 1956, H. Wolf 1981), various recommendations regarding backward throws are provided, such as:

the attacker assumes a right-handed stance while the opponent stands in front, creating a standard mutual position;

ignoring the direction in which the opponent is likely to fall within the frontal plane of motion has been deemed effective.

Moreover, during the preparatory stage, the throwing technique is designed to counteract the opponent's resistance in the opposite direction, thereby providing targeted influence on the adversary.

In our view, a properly structured (formalized) throwing technique should provoke a reactive response from the opponent in the direction of the applied force.

This is consistent with the findings of Yu. A. Shulika (1981, 1988, 1993), who reported a decrease in the number of complex coordination throws – such as O-uchi-gari and Ko-uchi-gari – as judokas' experience and age increase. These throws, however, remain essential at advanced stages of the sport, as opponents tend to move away from conditioned responses, maintaining stability not only by increasing static tension but also by expanding their stance. This pattern limits the feasibility of employing widely used and relatively simple techniques such as De-ashi-harai (lateral sweeping), Ko-soto-gari (minor outer reap), O-soto-gari (as per Shulika, cutting), and O-soto-otoshi (major outer drop).

If one considers the negative statistical indicators obtained from processing pedagogical observations, the problem of reliably assimilating counterattacks against opponents with wide stances becomes even more pressing. In the first and second stages of skill acquisition, the greatest difficulty arises in learning throws that require unidirectional–multifaceted and unidirectional–unidirectional synergy between upper and lower extremities during offensive actions in opposing directions.

The well-known exercise Uchi-komi, which imitates the initiation of O-uchi-gari throws, includes an initial pivot of the attacker in the first stage, followed by a second-stage throwing motion that requires a continued rotation. Executing this sequence smoothly is nearly impossible, as it requires a 180° pivot on a single support

leg when transitioning from stage one to stage two. This significantly reduces the potential for a forceful impact on the opponent.

Thus, when imitating the initiation of an O-uchi-gari throw (hooking the opponent's leg from the inside) (Figure 1), the attacker, according to the conventional model, turns sideways toward the opponent by aligning their supporting feet parallel to the opponent's shoulder axis in order to insert their leg between the opponent's feet. Subsequently, during the inner sweep (kansa), the attacker is required to face the opponent – which becomes problematic due to the anterior rotation of the shoulder axis and the outward movement of the support leg (as shown in Figure 1).



Figure 1. Stages of the O-uchi-gari throw according to the scheme of foot positioning, body weight distribution, and movement direction vectors

Thus, their ability to control the integrity of multi-directional movements is lost. Furthermore, in the second stage, it is recommended to pull with the left hand and push the opponent's shoulder with the right (Shulika, Yu.A. 2006). However, it is difficult to imagine an opponent yielding to such a force, as pushing with the hand may allow the resisting judoka to shift the attacked leg over the attacker's leg, thereby neutralizing the throw.

A similarly opposing movement is observed in the execution of the complex coordination-based Ko-uchi-gari throw (minor inner reap from the inside) (Figure 2).

KO-UCHI-GARI

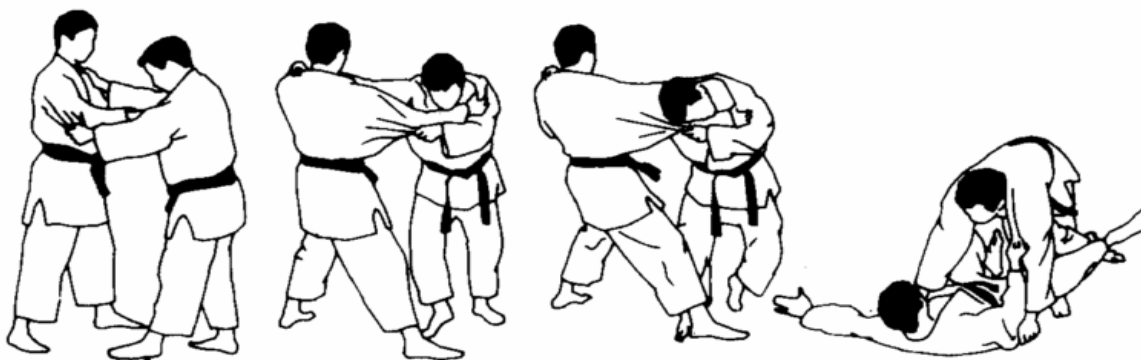


Figure 2. Stages of the Ko-uchi-gari throw according to the scheme of foot positioning, body weight distribution, and movement direction vectors

The attacker's leg rotates to the left, causing a shift in the alignment of the attacker's shoulder axis. To execute the throw effectively, the opponent's stance must be broken directly backward, which requires a reverse movement of the shoulder axis. However, even with a supportive stance and only conditional resistance from the opponent's arms, it remains difficult to apply sufficient force.

Therefore, practical experience shows that this type of throw is rarely executed successfully. It becomes the "weapon" of only a select few judokas who have mastered it – not due to its widespread applicability, but because, through a process of incidental development, they have formed an optimal methodology that creates the necessary synergy. As a result, there emerges a need for preliminary actions that force the opponent to release their attacked leg voluntarily – a highly problematic requirement. Moreover, learning throws in a pre-structured manner is not always advisable, as under real combat conditions, opponents rarely react to preparatory movements or engage with them dynamically while maintaining balance (see Table 1).

Table 1. Classification of Throwing Phases by Directionality and Movement Type in Judo.

No	Exit	Class	
a	Approach	Multilateral	
b	Entry	Multidirectional	
c	Entry	Unilateral	
d	Exit	Multidirectional*	

* – Applies to throws involving counter-directional class tendencies, e.g., inward sweep with leg hook (capture) and drop using both legs.
 ** – Includes leaning throws within same-directional class (e.g., outer leg sweep combined with pushing).

Specialized literature lacks unified methodological instructions for executing these classes of throws. Furthermore, provoking the opponent to move their attacked leg in the desired direction proves impractical during the preparatory stage and can even result in loss of control or positional disadvantage (Arsenev A.B.).

Often, to execute the lower segment of the inward sweep, the attacker removes weight from the attacked leg and pushes the opponent in the opposite direction. This constitutes multilateral preparation, which is not part of the main structure of the throw [68]. Accordingly, it becomes necessary to master the throw without relying on multidirectional preparation and to introduce multidirectional exercises into the technical-tactical training phase.

A survey conducted among judokas of various age and skill levels revealed that only a small percentage had acquired the listed throws to a level where they could effectively apply them in competitive matches. One of the contributing factors is the tendency to practice these throws from frontal positions – which are rare in real combat – rather than from asymmetric positions, where the structure of the throw must be adapted.

For instance, if a right-handed attacker attempts to apply O-uchi-gari from a mirrored stance, they will be operating on the opponent's unweighted leg, which may be freely moved. It becomes difficult for the opponent to perform the necessary initial side rotation, then return to the original position and initiate a push. On the other hand, from a corresponding stance, the attacker acts on the opponent's far, loaded leg, where the initial turn to the side can easily result in the attacker compromising their own position. These tactical contradictions call for further research – not only to verify the practical validity of such throws but also to assess whether they should be retained in the official training curriculum.

As an example, these complex throws are included in both introductory and secondary technical sequences of the judo curriculum (Judo 2003), starting from the very first year of training.

CONCLUSION AND SUGGESTIONS

The study has shown that backward throwing techniques in judo, such as O-uchi-gari and Ko-uchi-gari, involve complex coordination and biomechanical challenges that significantly impact their effectiveness in competitive settings. The difficulty arises primarily from the need to unbalance the opponent against their natural posture and dynamic resistance, particularly in asymmetrical stances and under real-time conditions. Current methods of instruction often lack adaptability and do not reflect the variability of actual combat situations, leading to inconsistent mastery among athletes.

To advance the development of backward throwing techniques in judo, it is essential to revise the existing pedagogical approaches by integrating multidirectional preparatory drills and reactive simulation scenarios. Training should place greater emphasis on dynamic balance disruption and synchronization between upper and lower body movements. Furthermore, the standard curriculum must be reassessed to better align technical sequences with the practical demands of competitive matches, especially considering the tactical limitations of frontal-position throws. Finally, broader empirical studies are recommended to validate technique inclusion criteria within official programs and to ensure that athletes acquire skills that are not only formally correct but also functionally viable under pressure.

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