

MODERN TECHNIQUES FOR EXECUTING THE TWO-HANDED BACKHAND IN TENNIS

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Abstract: The two-handed backhand (Two-Handed Backhand – 2HBH) is one of the most widely used techniques in contemporary tennis, standing out for its biomechanical stability, efficiency in force production and superior ball control. This article analyzes in depth the technical characteristics of contemporary 2HBH execution, the role of grips and segmental positioning, the structure of the kinetic chain and the influence of technology in optimizing execution. It also addresses the benefits of the technique for athlete health, current teaching methods, and the limits of the existing research. The conclusions emphasize that 2HBH performance depends on segmental synchronization, active trunk involvement and the appropriate utilization of the non-dominant hand, within an individualized context adapted to each player.

Key words: tennis, two-handed backhand, biomechanics, grip, kinetic chain, training.

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INTRODUCTION

Modern tennis is characterized by intensity, high execution speed, and tactical dynamism. The evolution of equipment, playing surfaces, and training methods has led to significant changes in stroke technique. Among these, the widespread adoption of the two-handed backhand (2HBH) is evident among top players in both the men's and women's tours.

The two-handed backhand offers significant biomechanical advantages: increased stability at impact, improved trajectory control, efficient topspin generation, and reduced unilateral loading on the joints (Girard, O., & Millet, G. 2017). Its compact execution facilitates the management of rapid rallies, and the active involvement of the non-dominant hand is essential for force production. In the context of high-performance sport, the 2HBH is an indispensable technique, and

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an in-depth understanding of the biomechanical and pedagogical structures of its execution is necessary to optimize athlete development and to prevent injuries.

Types of Tennis Racket Grips and Their Specific Characteristics

The terminology associated with the two-handed backhand reflects the biomechanical complexity and the technical evolution of the stroke (Elliott, B. C. 2020). The central element of execution is the racket grip, which determines the orientation of the racket face, wrist position, and impact consistency. In contemporary tennis, the predominant grip combination for the 2HBH is Continental for the dominant hand and Eastern or Semi-Western for the non-dominant hand. This configuration offers an optimal balance between stability and mobility, enabling efficient vertical rotation required for topspin production Hay (J. G., & Reid, J. G. 2016).

The Continental grip placed in the dominant hand maintains a neutral wrist angle and reduces excessive stress on the joint, an essential aspect for preventing tendinopathies. The non-dominant hand becomes the primary generator of force, acting as the biomechanical engine of the stroke: it pulls, rotates, and accelerates the racket.

Technical terminology also includes hitting stances. The square stance allows a linear and stable transfer of body weight, whereas the semi-open and open stances, characteristic of contemporary tennis, facilitate rapid reactions and adaptation to high tempo. The concept of the unit turn—simultaneous rotation of the shoulders and trunk during the preparation phase—creates elastic tension necessary for acceleration Kovacs, M., & Ellenbecker, T., (2018). Terms such as lag position, kinetic chain, follow-through, and angular velocity refer to essential components of contemporary execution: fluidity, control, energy efficiency, and the integration of body segments into a unified movement (Ferdinands, R., et al. 2019).

Overall, contemporary 2HBH terminology highlights a refined biomechanical approach in which grip, positioning, and segmental rotation operate in an optimized synergy built on the principles of the kinetic chain.

Biomechanical Aspects of the 2HBH

The two-handed backhand functions on the basis of the kinetic chain, whereby energy is transmitted sequentially from the ground through the lower limbs, trunk, shoulders, and arms to the racket (Roetert, P., & Kovacs, M. 2019). The preparation phase entails storing potential energy as elastic tension in the trunk musculature. Pelvic rotation and lower-limb extension generate the primary force, while the arms—especially the non-dominant arm—convert this energy into racket acceleration. Impact occurs in front of the body, within a controlled and stable interval, and the continuity of execution reduces energy losses and increases trajectory precision (Neville, J., et al. 2020).

Modern execution of the two-handed backhand constitutes a synthesis of biomechanical, psychomotor and tactical principles, conceived not only for maximal performance but also for reducing injury risk and optimizing energy efficiency. It may be analyzed through a holistic lens in which each body segment and each phase of the movement contribute to the final objective: efficient energy transfer from the body to the racket and from the racket to the ball, under constraints of time, space and opponent.

The initial preparation phase, referred to in the specialized literature as the preparatory phase, begins with a stable foot position and a unit turn of the trunk Hay, (J. G., & Reid, J. G. 2016). The legs are moderately flexed, with weight distributed between the heels and the balls of the feet, preparing vertical and lateral energy transfer. The pelvis and trunk rotate simultaneously, storing elastic energy in the obliques, spinal erectors and gluteal muscles. This phase is critical for directional control and for generating subsequent acceleration without energy loss.

The acceleration phase, or propulsive phase, entails the coordinated transfer of energy from the ground to the racket through the kinetic chain (Savelsbergh, G. J. P., et al. 2020). The lower

limbs push against the ground, the pelvis rotates and the trunk transmits energy to the shoulders and arms. The non-dominant hand, acting as the primary motor of the stroke, imparts the rotation required for topspin and controls the trajectory (Martinez-Gomez, R., et al. 2020). The dominant hand stabilizes the racket face and adjusts the impact angle, preventing deviations and losses of precision. Perfect timing within this segmental chain determines not only maximal ball speed but also stroke consistency under dynamic match conditions.

The impact phase is the peak of execution, where the accumulated energy is transferred optimally to the ball. Impact is produced in front of the body, near the center of mass, with the arms slightly flexed and the racket face oriented according to tactical intent. Biomechanical research indicates that an impact point positioned too close to the body or too late dramatically reduces the efficiency of energy transfer and increases loading on the shoulder and elbow joints (Crespo, M., & Reid, M. 2018).

The follow-through completes the movement, ensuring controlled dissipation of energy and preparation for the next response. This phase is not merely an aesthetic formality, but an essential component of kinetic-chain integration, preventing overload and maintaining postural balance. Modern execution, therefore, cannot be reduced to arm technique alone: it is a complex choreography in which each body segment contributes to performance optimization.

Modern Execution of the Two-Handed Backhand

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Health-Related Aspects

The health-related approach in the context of the two-handed backhand is multidimensional, involving both injury prevention and the harmonious development of musculature and joints. Compared with the one-handed backhand, the 2HBH distributes the force demand between both upper limbs, reducing unilateral loading on the elbow and shoulder of the dominant arm (Reid, M., & Elliott, B. 2023). This more symmetrical distribution contributes to preventing common tendinopathies, such as lateral epicondylitis or distal biceps injuries.

Over the long term, the involvement of the trunk and pelvis promotes muscular balance and core stability, reducing the risk of postural imbalances and lumbar overutilization. From a neurological perspective, appropriate execution of the 2HBH develops bilateral coordination and segmental synchronization, which are essential for high-level performance (Bonato, M., et al. 2020).

The physical preparation program for the two-handed backhand should integrate trunk mobility exercises, scapular stabilization, and functional strength of the lower limbs. In addition, recovery techniques, targeted stretching, and periodic biomechanical assessment of the stroke contribute to reducing overutilization risks. In conclusion, when practiced appropriately, the two-handed backhand is not only technically and tactically effective but also beneficial for the athlete's long-term health, making this stroke a central element in developing and sustaining performance (Girard, O., & Millet, G. 2017).

TRAINING AND TEACHING IMPLICATIONS

Teaching and training the two-handed backhand in contemporary tennis requires a systemic, multidisciplinary approach that integrates knowledge from biomechanics, physiology, sport psychology, and pedagogy. At doctoral level, analysis must go beyond simple technical instruction, addressing the learning process as a complex interaction between the athlete's organism, task requirements, and the performance environment (Savelsbergh, G. J. P., et al. 2020).

Training may be structured across several levels of complexity. At the initial level, emphasis is placed on postural control, foot positioning, and perception of the ball's trajectory—elements essential for stability and stroke accuracy (Whiteside, D., et al. 2017). In this stage, the athlete develops body awareness and understands the relationship between trunk rotation, arm movement, and ball contact. Exercises should be progressive: from stationary strokes, to controlled movement strokes, and then to dynamic situations with an opponent.

As the athlete progresses, training focuses on optimizing the kinetic chain through exercises that simultaneously engage the legs, pelvis, trunk, and arms. An ideal example is integrating the unit turn with weight transfer and trunk rotation to generate efficient topspin and high ball speed. At this stage, the coach employs systematic observation, video analysis, and immediate feedback to appropriate subtle technical aspects such as racket-face angle, timing of contact, and arm extension during the follow-through (Hay, J. G., & Reid, J. G. 2016).

Individualization of training is a central principle in teaching the two-handed backhand at an advanced level. Anthropometric differences, joint mobility, segmental strength, and each athlete's playing style influence the optimization of grip, stance, and rotational sequence. For example, players with shorter arms and a more flexible torso may accommodate a more pronounced racket-face angle, while athletes with greater strength in the non-dominant arm can generate additional topspin through a more vertical racket acceleration. This individualization is based on detailed biomechanical evaluations, including measurements of racket speed, joint angles, and muscular tension (Neville, J., et al. 2020).

Modern technology plays an essential role in teaching and training the two-handed backhand. Motion-capture systems, IMU sensors (Inertial Measurement Units), and force platforms enable real-time monitoring of the kinetic chain, highlighting segmental deviations and load distribution. Objective data analysis allows immediate technical adjustments, reduces overload risk, and increases motor-learning efficiency. In addition, these tools facilitate applied research by comparing different technical approaches and identifying the most effective methods for different athlete profiles (Rogowski, I., et al. 2021).

From a pedagogical perspective, the teaching process must be progressive, contextualized, and adapted to the athlete's cognitive and motor level. Starting with visual demonstrations and verbal explanations, the athlete is guided to explore movement variability, develop rapid adjustment capacity, and interpret intrinsic bodily feedback. Subsequently, the coach introduces situational drills and match scenarios in which tactical decision-making and rapid adaptation to variations in ball trajectory become fundamental components of learning.

Finally, complementary physical preparation is essential. Developing functional trunk strength, scapular stabilization, shoulder flexibility, and pelvic mobility are sine qua non conditions for safe and effective execution (Nassib, S., & Rogowski, I. 2021). Specific exercises—such as resisted rotations, trunk extensions, and plyometric drills for the lower limbs—reinforce energy transfer through the kinetic chain and minimize injury risk (Savelsbergh, G. J. P., et al. 2020).

In conclusion, training and teaching the two-handed backhand is not limited to technical repetition. It is an integrated, multidimensional process in which biomechanical analysis, individualization, technology, and advanced pedagogy converge to create an athlete capable of executing the stroke with maximal efficiency, consistent performance, and long-term durability.

DISCUSSION AND LIMITATIONS

Although the literature on the 2HBH is extensive, significant limitations remain. Most studies are conducted in laboratory settings and do not faithfully reflect the dynamics of a real match, where fatigue, psychological pressure, and variability in incoming balls influence execution (Müller, E., & Benko, U. 2022). Longitudinal studies on the impact of technique on health are relatively few, and individual biomechanical diversity complicates the generalization of ideal execution models (Kramer, T., et al. 2021). Future research should use real-time monitoring technologies and explore long-term technical adaptations.

CONCLUSIONS

The two-handed backhand constitutes a fundamental contemporary tennis technique characterized by biomechanical efficiency, stability, and tactical adaptability. Correct execution reduces injury risk, optimizes energy transfer, and offers the athlete with a significant competitive advantage. By using appropriate grips, efficient trunk rotation, and appropriate synchronization among body segments, players can develop a high-performing and safe 2HBH. Modern training, supported by technology, offers significant opportunities to improve execution and to individualize the athlete-development process.

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