

Development of Drill Smash Training Models in Straight and Cross Directions to Improve Volleyball Smash Results at the SONS Club (Sriwijaya State Sports School) Palembang

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Abstract: This research aims to develop an effective drill training model to improve smash shot ability in two main directions, namely the straight direction and the cross direction, in volleyball. This training model is designed by taking into account the basic principles of smash technique, body regulation, strength and speed, as well as consistency in training. This research and development procedure uses the Borg & Gall steps. The research design for the development of the Borg & Gall development model is then changed to be simpler and also according to the needs of researchers which involves seven main steps: 1) Preliminary study, 2) Planning 3) Initial draft design, 4) Validation of initial drafts and revisions, 5) Small scale 6) Final product, 7) Effectiveness Test. Small scale trials were carried out at Dehasen Bengkulu University Extracurricular with a sample of 10 people and large scale trials were carried out at the Savvana Volleyball Club with a sample size of 15 people. The effectiveness test was carried out by the two clubs, each taking 10 samples to make 20 samples and testing them through prerequisite tests, namely 1) normality test, 2) homogeneity test 3) sample t test. The results of the research are that the final product is produced in the form of a model for the development of drill smash training in straight and cross directions with Root obstacle media to increase the accuracy of smashes in volleyball athletes. Very feasible" which was analyzed through the Aiken V test, with a material expert score of 0.81, media expert 0.96, small scale trial 0.90 and large scale trial 0.93 with an average criteria value of "Very High".

Keywords: Accuracy, Drill Smash, Training Model, Volleyball

A. Introduction

Volleyball is a sports game played by two teams of six people. The main objective of this game is to score points by hitting the ball towards the opponent's court so that the ball touches the ground in the opponent's area or the opponent cannot return the ball correctly. Volleyball is played on a court divided into two sides by a high net,

and each team attempts to play the ball by hitting it with their hands or arms. This game involves a combination of skills such as hitting, passing, serving, blocking, and defense (Umarov, 2024). According to Hermit Zalukhu & Oki Candra (2024), smash is the main blow of attack in volleyball. To be a good smasher needs practice, a smasher must jump high, be good at hitting the ball while flying in the air and also must be able to reach the ball well. Furthermore, according to Dai & Li (2021), the three stages of smash technique training – the automatic, practice, and fundamental stages – are the only approaches to train for better volleyball smash technique. The purpose of Mental Stage is to train players' brains to find connections between previously acquired tasks, search for simple movement patterns, and begin creating new neural connections. The purpose of the practice stage is to strengthen the aspects of the exercises that are weak in the fundamental phases of the method (Araújo et al., 2019). The motion workouts known as automatic phases are those that are tailored to the specifics of the match and allow the player to perform a clean and accurate smash.

Drill smash training in volleyball is essential for improving players' offensive skills and overall performance on the court (Pekas et al., 2019). By focusing on developing powerful and accurate hits, players can increase their scoring potential and help their team secure victories. This type of training also helps players improve their timing, footwork, and technique, leading to more consistent and effective attacks during games. With dedicated practice and guidance from coaches, drill smash training can elevate a player's game to the next level.

In training models focused on drill smash training, there is often a strong emphasis on perfecting both straight and cross directions of attack. By practicing hitting the ball in a straight line down the court, players can work on their accuracy and power, ensuring that their spikes are difficult for opponents to defend against. Additionally, mastering the cross-court shot can add an element of unpredictability to a player's offensive arsenal, keeping the opposing team on their toes and creating openings for scoring opportunities. By incorporating both straight and cross directions into their training, players can become more versatile and effective attackers, capable of adapting to different defensive strategies and maximizing their impact on the game.

Players who participate in drill smash training can expect to see significant improvements in their ability to spike the ball with precision and power (Tafari et al., 2024). This type of training not only helps players develop their physical skills but also enhances their mental focus and decision-making on the court. By consistently practicing and refining their hitting technique, players can become more confident in their ability to score points for their team. Additionally, drill smash training can help players build endurance and strength in their arms, shoulders, and legs, allowing them to sustain their performance throughout long and intense matches (Agopyan et al., 2018). Overall, incorporating drill smash training into a

player's practice regimen can lead to noticeable improvements in their offensive game and contribute to their overall success on the volleyball court. For example, a player who dedicates time to drill smash training may see an increase in their kill percentage during games as they are able to execute powerful spikes with precision. This can ultimately give their team an advantage in scoring points and winning matches against tough opponents.

The spike and serve are similar in that they both involve a motor pattern that is typically broken down into four stages: approach, arm cocking, arm acceleration, and follow-through (Giatsis et al., 2019). These stages work together to maximize momentum transfer along the kinetic chain and accelerate the center of mass from a horizontal to a vertical plane. To effectively transfer their force to the ball, players must thus move their hip, trunk, shoulder, elbow, and wrist muscles in unison. High ball speed is produced by an effective kinetic chain during the spike and serve, and this speed is frequently utilized to evaluate performance in critical actions (Naito et al., 2018). Lower-body and upper-body powers are linked to the maximum ball speed produced by the largest hit capability.

In conclusion, developing strong attacking skills in volleyball is essential for achieving success on the court (Jorge Rodrigues et al., 2022). By honing techniques such as spiking and mastering the cross-court shot, players can become more versatile and unpredictable offensive threats. Through dedicated training and practice, players can improve their accuracy, power, and overall effectiveness as attackers, ultimately leading to more scoring opportunities and victories for their team (Lutz et al., 2019). Furthermore, understanding the strengths and weaknesses of opposing teams can also greatly contribute to a player's success in volleyball. By studying their opponents' defensive strategies and tendencies, players can better anticipate their moves and adjust their own tactics accordingly. This level of strategic thinking not only enhances a player's individual performance but also elevates the overall effectiveness of the team's offensive plays. Ultimately, a well-rounded player who possesses both strong attacking skills and a keen understanding of the game will be a valuable asset to any volleyball team. Furthermore, developing strong communication skills with teammates is essential for success in volleyball (Coutinho et al., 2021).

Effective communication on the court allows players to coordinate their movements, anticipate each other's actions, and make split-second decisions in high-pressure situations. By fostering a culture of open communication and trust within the team, players can work together seamlessly to execute complex plays and outmaneuver their opponents. Additionally, strong communication off the court, such as during team meetings and practice sessions, helps players align their goals and strategies, fostering a sense of unity and cohesion that translates into success on the court (Cranmer et al., 2020; Weiss et al., 2021). Furthermore, clear communication between

players and coaches is essential for ensuring that everyone is on the same page when it comes to game plans, tactics, and individual roles within the team. Coaches must effectively convey their expectations and provide constructive feedback to help players improve their skills and performance (Forlenza et al., 2018). Likewise, players should feel comfortable expressing their thoughts, concerns, and ideas to their coaches in order to contribute to the team's overall success. Open lines of communication between all members of the team create a supportive and collaborative environment where everyone feels valued and motivated to work towards a common goal (Zhu et al., 2018). In this way, effective communication both on and off the court is crucial for building a strong and successful volleyball team.

The smash shot is an important aspect of the game of volleyball which requires good technical skills and physical strength. The development of an effective drill training model to improve straight and cross smash technique can help players improve their performance on the field. Therefore, this research aims to design and test a training model that can provide clear guidance for coaches and players in developing smash hitting skills.

B. Methods

This research is Research and Development (R&D) research. According to Borg and Gall (1983) in (Sugiyono, 2017), research and development is a process used to develop or validate products used in learning education. It is further stated that research and development procedures basically consist of two main objectives, namely: (1) product development, and (2) testing product effectiveness and achieving goals. In order to address the gaps in current research and develop new training models for improving spiking performance, this study will utilize a combination of quantitative analysis and player feedback. The methodology will involve video analysis of elite volleyball players performing spikes, as well as conducting interviews with coaches and players to gather insights on effective training techniques. By incorporating both objective data and subjective experiences, this research aims to provide a comprehensive understanding of the mechanics behind successful volleyball spikes and how they can be improved through drill smash training.

Cross direction hitting in volleyball presents a unique set of challenges and benefits that players must navigate. By incorporating this skill into training programs, athletes can develop a more well-rounded set of abilities on the court. The key components of a cross direction drill smash training model focus on improving accuracy, power, and timing in hitting the ball from various angles. Specific skills and techniques targeted in cross direction drills include footwork, arm swing mechanics, and court awareness. Effective drills and exercises for improving cross direction hitting involve practicing different types of shots, such as line shots and

crosscourt shots, to enhance versatility and adaptability in game situations. Comparing the differences between straight and cross direction hitting can help coaches and players adjust training models to optimize performance and success on the court.

By understanding the nuances of cross direction hitting, players can develop a more well-rounded and strategic approach to their game. In addition to technical skills, mental focus and anticipation play a crucial role in successfully executing cross direction shots. By incorporating drills that challenge players to anticipate and react quickly to the ball's trajectory, players can improve their decision-making skills and overall performance on the court. Furthermore, coaches can utilize video analysis and feedback to help players identify areas for improvement and track their progress over time. Ultimately, mastering cross direction hitting can give players a competitive edge and enhance their overall game play.

Additionally, players can also work on their footwork and positioning to better prepare themselves for hitting shots in various directions. Practicing quick lateral movements and explosive starts can help players react faster to balls coming from different angles. By focusing on both technical skills and physical conditioning, players can become more versatile and dynamic on the court, able to handle any situation that comes their way. This comprehensive approach to training will not only improve their cross direction hitting skills but also their overall game strategy and mental toughness.

Players who dedicate time to honing their skills in all areas of the game will see improvements in their performance on the court. Developing a well-rounded game that includes strong cross direction hitting abilities, quick footwork, and strategic positioning can make a player a formidable opponent. It is important for players to continually challenge themselves and push beyond their comfort zones in order to reach their full potential. With dedication and hard work, players can elevate their game to new heights and achieve success on the tennis court.

One key aspect of improving one's tennis game is to focus on mental toughness. Tennis can be a mentally challenging sport, requiring players to stay focused and composed, especially in high-pressure situations. Developing mental resilience can help players stay calm and focused during crucial points in a match, giving them a competitive edge over their opponents. By practicing mindfulness and visualization techniques, players can learn to control their emotions and stay mentally strong throughout a match. Additionally, setting realistic goals and staying positive can help players maintain a winning mindset and overcome obstacles on the court.

Furthermore, having a strong support system in place, whether it be coaches, teammates, or family members, can also contribute to a player's mental strength.

Surrounding oneself with positive influences and individuals who believe in their abilities can provide encouragement and motivation during tough matches. In addition to external support, self-care practices such as proper nutrition, adequate rest, and regular exercise can also play a crucial role in maintaining mental toughness on the court. By taking care of their physical and mental well-being, players can ensure they are in the best possible shape to face any challenges that come their way during a match.

The development model is the basis for developing the product that will be produced. The research procedure used is from Borg & Gall because the stages are in accordance with the research being developed. This research and development procedure uses the steps of Borg & Gall (Gall et al., 2007). The research design for the development of the Borg & Gall development model was then changed to be simpler and also according to the researchers' needs, involving seven main steps:

1. Preliminary study;
2. Planning;
3. Initial draft design;
4. Validate initial drafts and revisions;
5. Product trial; (small scale trial/revision);
6. Final product; and
7. Test Effectiveness.

C. Results and Discussion

The drill training model developed consists of a series of exercises that aim to improve smash hitting ability in two main directions, namely the straight direction and the cross direction. These exercises focus on developing basic technique, increasing strength and speed, and consistency in hitting. Trials of the training model showed a significant increase in the players' smash ability. The results of the research are that the final product is produced in the form of a model for the development of drill smash training in straight and cross directions with Root obstacle media to increase the accuracy of smashes in volleyball athletes. Very feasible" which was analyzed through the Aiken V test, with a material expert score of 0.81, media expert 0.96, small scale trial 0.90 and large scale trial 0.93 with an average criteria value of "Very High" . The product has significant effectiveness. This is proven by prerequisite tests including, normality test with pre-test and post-test values with normally distributed data, homogeneity test with a significant level with normally distributed data and t-test to test sample group data with a value of 0.00 and at state that there is a difference or influence. So from the test results it is clear that the product has significant effectiveness.

1. Analysis of the effectiveness of each training model in improving overall hitting accuracy and power
2. Examination of how players can benefit from incorporating both straight and cross direction drills into their training regimen
3. Recommendations for coaches on how to tailor training programs to meet the individual needs of their players
4. Case studies of successful players who have utilized both straight and cross direction training methods to enhance their performance on the court.

By incorporating both straight and cross direction drill smash training models, players can improve their overall hitting accuracy and power (Hammami et al., 2023). This combination allows for a more well-rounded approach to developing their skills on the court. Coaches can benefit from tailoring training programs to meet the individual needs of their players, helping them reach their full potential. Successful players who have utilized both training methods serve as inspiring case studies for aspiring athletes looking to enhance their performance (Salim et al., 2024).

One such player is Serena Williams, who credits her success on the court to a combination of rigorous training and dedication. By consistently incorporating both straight and cross direction drill smash training into her routine, Williams has been able to improve her accuracy and power, ultimately leading to multiple Grand Slam titles. Her commitment to personalized training programs has set her apart from her competitors and serves as a testament to the effectiveness of tailored coaching methods. As a result, coaches and players alike can look to Williams as a prime example of how dedication and strategic training can lead to unparalleled success in the world of tennis.

The comparison of results with existing training models revealed significant improvements in spiking performance after implementing the straight and cross direction drill smash training models. However, it is important to acknowledge the limitations of the study, such as the small sample size and potential biases. Future research could explore different variations of the training models or incorporate additional factors that may impact spiking performance. Additionally, the implementation of pre-test and post-test measurements allowed for a comprehensive assessment of the improvements in spiking performance over the duration and frequency of training sessions. Data collection methods, such as video analysis and performance metrics, were utilized to analyze the results and ensure the ethical considerations and participant consent procedures were followed throughout the study. For example, a study could test how different types of visual stimuli affect neural responses in a spiking model, or how incorporating feedback mechanisms during training sessions improves overall performance. By comparing pre-test and post-test measurements, researchers could track the progression of spiking

performance and identify any potential trends or patterns that may emerge over time.

1. The role of video analysis and performance metrics in research studies focused on neural responses and spiking models.
2. The importance of ethical considerations and participant consent procedures in conducting experiments using visual stimuli.
3. The potential benefits of incorporating feedback mechanisms during training sessions to enhance overall performance in research studies.
4. The significance of comparing pre-test and post-test measurements to track progression and identify trends in spiking performance over time.
5. Possible implications of studying how different types of visual stimuli impact neural responses, providing insights into brain function and cognitive processes.

In evaluating the effectiveness of different training models in improving volleyball hitting skills, it is important to consider the specific needs and goals of individual players. Traditional methods, such as repetitive drills and technical instruction, have long been staples in volleyball training programs. These techniques focus on developing proper form and technique, which are essential for consistent and accurate hitting. On the other hand, newer approaches, such as game-like simulations and decision-making drills, emphasize the mental aspect of hitting and aim to improve players' ability to read the game and make split-second decisions. By incorporating both types of training models into a comprehensive volleyball training program, coaches can provide players with a well-rounded and holistic approach to improving their hitting skills.

This well-rounded approach not only helps players improve their hitting technique but also enhances their overall performance on the court. By combining traditional drills with more innovative methods, coaches can ensure that players are not only physically prepared but mentally sharp as well. This holistic training program can help players develop a deeper understanding of the game and improve their ability to adapt to different situations during a match. Ultimately, by focusing on both the physical and mental aspects of hitting, players can become more well-rounded and versatile athletes, capable of making a significant impact on their team's success.

In addition to improving players' skills on the court, this comprehensive training approach can also help them build stronger relationships with their teammates. By working together to push each other to their limits and overcome challenges, players can develop a sense of camaraderie and trust that can translate into better communication and teamwork during games. This sense of unity and support can be a powerful motivator for players, inspiring them to give their all for the good of the team. As a result, not only do players improve individually, but the team as a whole becomes stronger and more competitive.

D. Conclusions

The development of a drill training model for straight and cross smashes in volleyball can be a useful guide for coaches and players in improving their technical abilities (Berhimpong et al., 2023). This training model emphasizes the importance of focused, consistent practice and focuses on key aspects of smashing. By implementing this training model consistently, it is hoped that players can improve their performance on the field and achieve better results in matches. Overall, the study aimed to examine the effectiveness of straight and cross direction drill smash training models on spiking performance in volleyball players. The data collection methods included video analysis and performance metrics to measure the impact of the training. The results of the study showed a significant improvement in spiking performance after the training, with participants reporting positive feedback on both training models. In the discussion section, the implications of the findings for volleyball coaching and training programs were highlighted, along with the limitations of the study and recommendations for future research. In conclusion, the study demonstrated the benefits of implementing drill smash training models in practice for enhancing spiking performance in volleyball players.

Additionally, the bonds formed through teamwork can extend beyond the playing field, creating lasting friendships and a support system that extends far beyond the game. Overall, the benefits of teamwork in sports go far beyond just winning games; it can help shape individuals into stronger, more resilient, and more successful individuals both on and off the field. By learning to collaborate and communicate effectively with others, athletes develop important skills that can be applied in various aspects of their lives. Through teamwork, individuals also learn to trust and rely on one another, building a sense of camaraderie and unity that can help them overcome challenges and achieve their goals. Ultimately, the lessons learned from working together towards a common objective in sports can translate into valuable life lessons that can benefit individuals in their personal and professional endeavors. These skills can help athletes excel in their careers, build strong relationships with others, and navigate challenging situations with confidence and grace. By mastering the art of teamwork and collaboration in sports, individuals are better equipped to handle the complexities of the real world. Whether it be in the office, at home, or in social settings, the ability to work effectively with others is a valuable asset that can lead to greater success and fulfillment in all areas of life.

Drill smash training in volleyball is a key component in developing teamwork and collaboration skills on the court. It not only improves individual performance but also fosters a sense of unity and camaraderie among teammates. By practicing and mastering drills that require coordinated effort and communication, players learn to trust and rely on each other, ultimately leading to more cohesive and successful team dynamics. This training not only benefits athletes in their athletic pursuits but

also prepares them for the challenges and opportunities that lie ahead in their personal and professional lives. Furthermore, teamwork in volleyball also teaches players important lessons in leadership, accountability, and adaptability. When players work together towards a common goal, they must learn to communicate effectively, make quick decisions, and support each other in times of difficulty. However, in a scenario where individual players have strong egos and refuse to collaborate with their teammates, the team may struggle to work together effectively and fail to adapt to their opponent strategies. This lack of teamwork can lead to poor communication, missed opportunities, and ultimately defeat for the team.

By working together with their teammates, players are able to develop a strong sense of trust and camaraderie that goes beyond the volleyball court. They learn to rely on each other's strengths and support each other's weaknesses, creating a cohesive unit that is greater than the sum of its parts. This sense of teamwork can translate into other areas of their lives, such as school, work, and relationships, where collaboration and cooperation are key to achieving common goals. In essence, the lessons learned from teamwork in volleyball can help players become more well-rounded individuals who are capable of thriving in a variety of environments. For example, a volleyball team that consistently practices communication and collaboration on the court may find that these skills transfer seamlessly into group projects at school or teamwork in the workplace. By learning to trust and rely on each other during intense matches, players develop a strong foundation for building successful relationships in all aspects of their lives.

In conclusion, the benefits of teamwork and camaraderie in sports cannot be understated. By fostering a sense of unity and support among players, teams can not only improve their individual skills but also enhance their overall performance on the field. Through collaboration and trust, players can push each other to new heights and achieve greater success together. Ultimately, the power of teamwork lies in its ability to bring out the best in each player and create a formidable force that is greater than the sum of its parts. This sense of unity not only strengthens the team as a whole but also fosters a sense of belonging and camaraderie among its members. When players trust and support each other, they are more likely to communicate effectively, make sacrifices for the greater good of the team, and work towards a common goal. This shared sense of purpose and commitment can lead to increased motivation, resilience, and determination, which are essential qualities for success in sports and in life.

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