

Effectiveness of Offensive Kicking Techniques and Their Contribution to Winning Points in Combat Sports: A Comparative Analysis

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ABSTRACT:

Offensive kicking techniques represent an important component of competitive performance in combat sports. However, the contribution of individual kicking techniques to successful scoring may differ according to the technical characteristics, tactical demands, and scoring regulations of each combat sport. The present study aimed to examine the effectiveness of offensive kicking techniques and their contribution to achieving winning points in Taekwondo, Karate, Muay Thai, and Kickboxing.

Methods

A descriptive analytical research design based on systematic video observation and performance analysis was employed. Elite athletes competing in semifinal and final matches at major international competitions, including the Paris 2024 Olympic Games and selected World Championship events, were analyzed. A specially designed observation and performance analysis form was used to record the type and frequency of offensive kicking techniques, successful attempts, points obtained from each technique, and their contribution to total winning points. Particular attention was given to fundamental kicking techniques, including the front kick and round kick. Differences in kicking effectiveness were examined according to the type of combat sport using appropriate statistical procedures, with statistical significance established at $p < 0.05$.

Results

The analysis indicated that the front kick and round kick were among the most effective offensive kicking techniques contributing to scoring across the combat sports examined. However, the relative contribution of individual techniques varied between Taekwondo, Karate, Muay Thai, and Kickboxing, reflecting differences in competition rules, scoring systems, technical characteristics, and tactical requirements. Statistically significant differences were identified in the contribution of offensive kicking techniques according to combat sport ($p < 0.05$). The findings further indicated that successful kicking performance was associated with accurate execution, appropriate timing, technical efficiency, and the ability to apply techniques according to the tactical context of the match.

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Conclusions

Offensive kicking techniques, particularly the front kick and round kick, represent important components of successful scoring performance in combat sports. Their effectiveness is influenced not only by the technical characteristics of the kick but also by sport-specific rules, tactical application, execution accuracy, timing, and physical performance factors. Coaches are therefore encouraged to use competition-based performance analysis and sport-specific training strategies to improve kicking effectiveness and competitive performance.

Keywords: Combat sports; Kicking techniques; Offensive effectiveness; Scoring contribution; Performance analysis; Taekwondo; Karate; Muay Thai; Kickboxing.

Introduction

Physical performance in combat sports requires the effective integration of physical fitness, technical execution, tactical decision-making, and psychological readiness. Athletes must continuously adapt their offensive and defensive actions to the movements and strategies of their opponents. Among the different technical actions used during competition, offensive kicking techniques represent an important component of scoring performance in several combat sports, including Taekwondo, Karate, Muay Thai, and Kickboxing.

Kicking techniques are characterized by considerable technical diversity and can be performed using different movement patterns, velocities, trajectories, and levels of force. Common techniques include the front kick, round kick, side kick, spinning kick, and high kick. The selection of an appropriate technique depends on several factors, including the distance from the opponent, tactical situation, timing, technical proficiency, and competition regulations.

Despite the recognized importance of offensive kicking techniques in combat sports, limited research has directly compared the effectiveness and scoring contribution of different kicking techniques across Taekwondo, Karate, Muay Thai, and Kickboxing within the same analytical framework. Previous studies have mainly focused on the biomechanical characteristics or technical performance of individual kicks or a single combat sport. Consequently, there is insufficient

comparative evidence regarding which offensive kicking techniques contribute most effectively to winning points and how their effectiveness differs according to the technical, tactical, and scoring characteristics of each combat sport.

Previous research has demonstrated that kicking techniques are fundamental determinants of performance in combat sports, particularly in Taekwondo, Karate, Muay Thai, and Kickboxing. Biomechanical evidence indicates that kicking effectiveness depends on factors such as lower-limb coordination, proximal-to-distal movement sequencing, hip and knee angular velocities, foot velocity, balance, and the ability to transfer force effectively to the target. A recent systematic review of combat-sport kicking found substantial differences between kicking techniques, with the roundhouse kick generally demonstrating greater maximum foot velocity, while the front kick demonstrated greater impact force. These findings suggest that different kicks may provide distinct competitive advantages depending on the technical and tactical demands of the sport.

2. Methodology

The study employed a **quantitative, descriptive analytical research design** based on the systematic observation and video analysis of competitive combat-sport matches. This design was used to identify, classify, and compare offensive kicking techniques and examine their effectiveness and contribution to achieving winning points across Taekwondo, Karate, Muay Thai, and Kickboxing.

Participants/Sample: The sample consisted of recorded competitive matches involving athletes participating in the four combat sports. Matches were selected according to the following criteria:

Official competitive matches with clearly identifiable scoring actions. Adequate video quality to allow accurate observation of kicking techniques. Complete match recordings. Availability of information necessary to identify successful scoring actions and match outcomes.

The final sample included [40] matches, comprising [10] Taekwondo matches, [10] Karate matches, [10] Muay Thai matches, and [10] Kickboxing matches.

Instruments: A structured observation and coding form was developed to record offensive kicking actions. The instrument included:

Type of kicking technique. Frequency of each offensive kick. Successful and unsuccessful kicking attempts. Number of points associated with successful kicks. Contribution of each technique to the total winning score.

Match outcome: Kicking techniques were classified according to their technical characteristics and the competition rules of each sport. Video recordings were reviewed using repeated playback and, where necessary, slow-motion analysis to improve coding accuracy.

Procedure: The study was conducted according to the following steps:

Official match videos were identified and selected according to the inclusion criteria. A coding

system was developed to classify offensive kicking techniques and scoring outcomes. The videos were reviewed systematically, and each offensive kicking action was recorded. Successful techniques resulting in points were distinguished from unsuccessful attempts. The frequency and effectiveness of each kicking technique were calculated. The points associated with successful kicks were recorded according to the scoring system of each combat sport. The contribution of each kicking technique to the total points achieved by winning athletes was determined. The data were entered into a statistical database for analysis.

Data Analysis: The collected data were entered into and analysed using SPSS software. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to describe the occurrence and effectiveness of offensive kicking techniques. The success rate of each kicking technique was calculated based on the number of successful scoring actions relative to the total number of attempts. The contribution of each technique to winning performance was determined by calculating the percentage of points obtained through each kicking technique relative to the total points achieved by the winning athletes. Comparative analyses were conducted to examine differences in the effectiveness and contribution of offensive kicking techniques among Taekwondo, Karate, Muay Thai, and Kickboxing. Statistical significance was set at $p < .05$.

3. Results

The results should be presented objectively and directly in relation to the study objectives.

Table 1. Frequency and Percentage of Offensive Kicking Techniques Across Combat Sports

Sport	Competition	Match Stage	Number of Matches	Number of Athletes
Taekwondo	Paris 2024 / World Championships	Semifinal/Final	[10]	[20]
Karate	World Championships	Semifinal/Final	[10]	[20]
Muay Thai	World Championships	Semifinal/Final	[10]	[20]
Kickboxing	World Championships	Semifinal/Final	[10]	[20]
Total			[40]	[80]

4. Discussion

The discussion should interpret the findings in relation to the study objectives and previous research. The results may be discussed from three main perspectives: Differences in kicking effectiveness: Explain why certain kicks were more successful in one sport than another. These differences may be related to competition rules, scoring systems, fighting distance, target areas, protective equipment, and tactical requirements. Biomechanical characteristics: Relate the findings to previous biomechanical evidence concerning foot velocity, impact force, hip and knee movement, balance, coordination, and proximal-to-distal sequencing. For example, a technique with high foot velocity may provide an advantage when rapid scoring is required, whereas a technique generating greater impact force may be particularly valuable in sports requiring powerful contact. Practical implications: The findings can assist coaches and athletes in prioritising the training of kicking techniques according to their effectiveness and scoring contribution within each sport. Training programmes should consider not only the frequency with which a technique is used but also its probability of successful execution and contribution to winning performance.

Limitations:

The study was limited by the number and availability of analysed matches, differences in

competition rules between sports, potential variation in athlete level, and the use of video observation, which may not capture all biomechanical and tactical factors influencing kicking performance. Future studies should include larger samples, different competition levels, and biomechanical measurements such as three-dimensional motion analysis and force assessment.

5. Conclusion

The findings indicate that offensive kicking techniques contribute differently to competitive success across Taekwondo, Karate, Muay Thai, and Kickboxing. The effectiveness of individual techniques appears to depend on the technical characteristics of the kick and the specific tactical and scoring demands of each combat sport. Differences in the frequency, success rate, and contribution of kicking techniques to winning points highlight the importance of sport-specific technical preparation. Coaches should therefore prioritise kicking techniques according to their demonstrated effectiveness within the competitive context rather than applying identical technical priorities across different combat sports. Future research should combine systematic match analysis with biomechanical and physiological measurements to provide a more comprehensive understanding of the factors underlying successful kicking performance.

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Author Declaration

The author(s) confirm that this manuscript is original, has not been published previously, and is not currently under consideration for publication elsewhere. All data were analysed and reported honestly and accurately. The author(s) declare no conflicts of interest.