

A Comparative Study of Technical Skilling among National and International Taekwondo Players in Punjab

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Abstract. The present research paper focuses on the comparative study of technical skilling among national and international Taekwondo players in Punjab. Technical skilling is an important component of Taekwondo performance because success in competition depends not only on physical strength, flexibility, or endurance, but also on accurate execution of techniques, kicking speed, balance, coordination, footwork, defensive response, counter-attack ability, and body control. In modern competitive Taekwondo, players are required to perform techniques under pressure and apply them effectively against a moving opponent. The study highlights that technical skill is developed through regular practice, expert coaching, repeated correction, sparring experience, and competition exposure. International-level players are expected to show better technical control because they usually receive higher-level training and greater competitive exposure. The paper also emphasizes the importance of assessing technical skill through coach rating, performance observation, target-based kicking tests, video analysis, and sport-specific assessment methods. This study is useful for coaches, academies, and sports institutions in identifying the technical strengths and weaknesses of Taekwondo players and improving training systems in Punjab.

keywords: Taekwondo, Technical Skilling, National Players, International Players, Kicking Accuracy, Balance, Footwork, Competitive Performance, Punjab

I. Introduction

Taekwondo is a modern combat sport that requires speed, accuracy, balance, coordination, flexibility, reaction ability, and proper body control. A Taekwondo player cannot become successful only through physical strength or stamina; the player must also perform offensive and defensive techniques with precision, timing, rhythm, and confidence. Technical skilling refers to the systematic development of sport-specific movements such as kicking, punching, blocking, footwork, guarding position, counter-attack, combination techniques, and recovery after movement. In competitive Taekwondo, technical ability is tested not only in practice but also during actual spar-

ring situations, where the player has to attack at the right time, maintain correct distance, control balance, and recover quickly after the movement. Therefore, technical skilling is directly linked with competitive performance.

At the national and international levels, the quality of technical performance becomes more important because the speed of the bout is high and the player has very little time to make corrections during the match. International players usually face stronger opponents, different fighting styles, and higher competition pressure. This exposure may help them improve kicking accuracy, speed, balance, footwork, defensive response, and counter-attack ability. In Punjab, Taekwondo players are participating at different competitive levels, but there is a need to compare the technical skilling of national and international players to identify performance gaps and suggest better training practices. The present study is therefore focused on understanding the technical skilling of Taekwondo players and its role in improving competitive performance.

Objectives of the Study

- To study the level of technical skilling among national and international Taekwondo players in Punjab.
- To compare kicking accuracy, speed, balance, and body control among national and international Taekwondo players.
- To examine the role of footwork, defensive response, counter-attack skill, and combination execution in Taekwondo performance.
- To suggest measures for improving technical skill training among Taekwondo players in Punjab.

II. Concept of Technical Skilling in Taekwondo

One of the most important factors of taekwondo performance is technical skilling. In taekwondo, a player does not become successful just by being physically strong, flexible, enduring, or having a fighting spirit. In addition to rapidity, technical skilling requires correct, precise, and competitive performance of each technique. Technical skilling is the systematic physical development of techniques used in taekwondo movements. It is the proper performance of offensive and defensive techniques with body balance, timing, rhythm, speed, accuracy and coordination. All the techniques of kicking, punching, blocking, footwork, body movement, guarding position, counter punch, combination punch, and recovering after movement are included under the technical skilling. Technical skilling and calculated upskilling have been taken as major dependent variables for the comparison between national and international taekwondo players of Punjab in this research study.

In modern competition taekwondo, skilling is not only about performing the basic skills of the art. The player must also perfect the art of using those skills in a sparring situation. This means being able to kick at the right moment, at the right target, from the right distance, and being able to recover from the kick quickly. While the player can perform the roundhouse kick during practice, it is only a technical skilling ability

if the player can perform the roundhouse kick against a moving target while standing, if the roundhouse kick can be done without being counter hit and if the technique can score in a match.

Technical skilling is closely tied to the skills level of the taekwondo player. At a basic level of sport, the technical skilling helps the player to perform movements properly. At the advanced level it helps the player perform techniques with greater speed, precision and efficiency. At the competitive level it helps the player use techniques under pressure and adapt them to their opponent's movements. This is why the technical skilling process is first learning, then practicing, then error-correcting coaching, and finally competition in what has been learned and practiced. The technical performance in taekwondo correlates with the speed of the player, the quickness, the balance, the kicking technique, the level of neuromuscular coordination, the movement efficiency, and the control of the lower limbs. Ölmez and Yüksek (2023) researched the role of technical speed and quickness in taekwondo and developed the Taekwondo Performance Protocol. The study by Paulauskas et al. (2025) found that elastic resistance training improved roundhouse kick technique. Barramuño-Medina et al. (2025) found that experienced taekwondo athletes showed more economical neuromuscular patterns than beginners during multiple roundhouse kicks, stressing that systematic coaching with correctives and specific sport-based training are essential because technical skilling is not a natural ability but rather something that can be developed with proper training and reinforcement.

Technical skilling is important in taekwondo.

Technical skilling is of paramount importance, because all competitive play is based on it. A player may have strength and stamina, but without technical skills for the events of taekwondo, they cannot be competitive. Technical skilling refers to a player's ability to perform actions in a targeted and efficient manner.

- Improves kicking accuracy: It makes sure that the player strikes the ball in the correct position.
- Develops speed of execution: the player will execute kicks, blocks and counterattacks rapidly in (interactive) game play situations.
- Maintains balance and body control: Proper technical training helps the player maintain their balance and body control before, during and after using techniques.
- Supports defensive response: A technically skilled player can successfully block, dodge, or counter the opponent's attack.
- Improves scoring ability: Technical skill allows the player to translate movement patterns from practice into actual scoring opportunities.
- Reduces unnecessary movement: a skilled player performs movements efficiently and avoids wasting energy through poor technique.
- Prevents injury risk: Prevents excessive strain on muscles, joints and ligaments when lifting at speed.
- Builds confidence: A technically trained player can deal with the most difficult players in a high-level situation.

A large aspect of technical skilling is not just to teach the player to be able to perform the technique, but to become more accurate, more controlled, more confident, and more useful within taekwondo competition.

III. Meaning and Nature of Technical Skilling

Technical skilling means the development of effective and accurate movement patterns, which are required in the performance of the taekwondo sport, through the learning, practicing, correcting and refining of sport-specific technical skills. The technical skills consist of the application of the above mentioned techniques (kicking techniques, punching techniques, blocking techniques, stances, guard positions, footwork, counterattacks, combinations) with effectiveness, precision, speed, rhythm, balance and control. The technical skilling is also practical: it is developed by physical practice, a player cannot become technically skilled either by reading about technique or by looking at demonstrations. Repetition of movement patterns and receiving feedback from coaches enables the body to learn the appropriate skill patterns through practice. The player will eventually learn the techniques by muscle memory, which is important since taekwondo does not allow for much time to consider one's next move during competition.

Technical skilling is also progressive, with stances, basic kicks, hand position and balance being the most basic skills taught. When the player becomes more confident and skilled, advanced kicks, combination skills, counterattacking, and spinning and mid-fight tactics can be learned. Higher techniques that require a higher degree of technical skilling will be performed against opponents of higher skill levels and thus will naturally require more precision. Technical skilling is not only a process of moving from the simple to the complex and from controlled practice to competitive performance. Technical skilling is performance oriented. The ultimate value of a piece of technical skill is tested by competition: a player may perform well in practice but only when he attempts to use it in competition is he really tested. Due to the various forms of pressure, fatigue, opponent movement, time limits and scoring that may occur during competition, the technically capable player must be able to perform techniques under difficult conditions. Technical skilling is related to motor learning, where the player initially has to consciously attend to the movements. The player thinks about foot placement, hip rotation, target line relative to hand guard, and balance. These movements become automatic with practice. At this stage, the player performs the taekwondo movements automatically, without having to think about every detail of their movements, allowing them to react quickly when a series of movements takes place.

Movement economy is also part of technical skilling. Movement economy is about using the body efficiently without wasting unnecessary energy. A technically skilled player uses no extra movement on attack and defense, and moves directly, quickly and with purpose in any situation. This is particularly important in taekwondo as matches feature repeated bursts of high intensity movement, so energy wasted through ineffi-

cient movement is not only wasted energy but leads to fatigue and compromised technical execution. Flexibility in technical skilling is another important aspect: you must be able to change techniques, depending on the height, the speed, the distance and the fighting style of the opponent. However, the same kick cannot be used in the same way for every opponent: for a taller one, a different distance is required; for a faster opponent, better timing and counter-attack. Technical skilling is not only the repetition of the same move but the ability to express it properly, according to the situation.

IV. Core Technical Skills in Taekwondo Performance

There are several core technical skills that are necessary in taekwondo and that without them a player will not be able to attack, defend, and maintain technical control during a taekwondo match. Core technical skills enable the practitioner to move, attack, defend, counter, and recover. Kicking is the most important core technical skill in taekwondo. Taekwondo relies heavily on kicking techniques, with the huge majority of scoring techniques being kicks. As well as kicking techniques, a fighter must develop his or her stance, footwork, body mechanics, balance, defensive responses, and recovery after getting countered. This is why the basic technical skills need to be developed together and cannot be seen as separate. Stance is where this technical performance starts. A good stance gives the player stability, readiness and control, whereas a weak stance may make a player lose balance during attacks and defenses. The guard position is equally important as it protects the body while getting the player into position, and the footwork allows the player to control distance and create an angle of attack. Defensive mechanics allow the player to avoid attacks and counterattack.

Common high kicks include the front kick, roundhouse kick, side kick, back kick, hook kick, axe kick, turning kick, spinning kick, and jumping kick, each of which has a different technique. The roundhouse kick requires a combination of hip rotation, speed, accuracy and fast recovery, while the side kick requires attention to body alignment, force direction, standing balance and extension control. Because the back kick requires timing, rotation, and target awareness, continual practice and adjustment are required to achieve optimal technique. In taekwondo, offensive techniques are used during competition to create an opportunity to score. This is accomplished by attacking and hitting perfectly with proper timing. An example of a mistake is uncontrolled attack, which occurs when a player attacks without sufficient distance and balance, and the opponent counters. Therefore, ball control and tactical awareness must feature in attacking skills, and, as a player has to defend against opposition attacks, defensive skills are also important. However, defence is not solely a matter of blocking. It also includes avoiding, retreating, dodging, and defending or preparing for counterattacks. A player with good defensive skills can prevent an opponent from scoring and create counterattack opportunities for a team.

Footwork is the foundation for movement between or within an attacking and defending position, allowing the player to enter attacking range, escape danger, and cre-

ate angles. A player with poor footwork may become too stationary. Taekwondo players today need to move constantly and cleverly. Footwork is of major importance. Combination skills have a high degree of importance at the higher levels. Single attacks are easy to see, so players develop combos to distract their opponent. One example of this may be kicking the opponent with one kick, then scoring with another. Combination technique requires rhythm, timing, balance, and rapid reaction. In these technical aspects, the taekwondo performance is very complicated, in that a player must not only know various techniques but also perform them with accuracy, speed, balance, timing, and control. This is why technical skill is one of the major areas of the present study.

V. Development of Kicking Accuracy, Speed, and Control

The kicking accuracy, speed and control are the basic elements of taekwondo's technical skill. Taekwondo competition depends on kicking techniques, so kicking quality is essential for performance. A successful kick must reach its goal quickly, but a kick that reaches goal with force but not where intended may not score, while a slower but more accurate kick may be well defended. Even a fast kick might result in an unbalanced player falling over due to the force of the kick, leaving them open to counterattacks. Kicking accuracy is how precise the kick is to the target. Points in taekwondo are only awarded when hitting the target areas so kicking accuracy is important. Distance, body angle, opponent's position and movement, and time are the main factors to be considered by a player in order to score. Accuracy can improve with practice on targets, pads, partners and when sparring. Focus and correcting oneself repeatedly can help.

Kicking speed is how fast the player can kick. Speed is a very important factor in taekwondo as the exchanges are usually extremely fast. The player's kick speed exceeds the opponent's reaction time which is determined by the player's reaction time, explosive power, flexibility, coordination and technical skill. Ölmez and Yüksek (2023) studied the impact of technical speed and quickness on taekwondo performance. Kicking control is defined as the ability to control the direction, force, balance and recovery of the kick. Control is important because once the technique has been executed, the player should be able to maintain balance so they can finish attacking, defend immediately after, or reposition. Without it, the player can fall or lose his balance, or expose the body.

Speed, accuracy, and control improve with practice, but accuracy and technique should be the player's main focus initially. But if speed is the first priority, then in most cases a good technique may not be learnt. Speed and power may come later after the technique. Only at the advanced level can the kicks be freely practiced during sparring sessions, the combat environment for which they are used.

Physical conditioning is important to kicking. Lower limb strength, core stability, hip flexibility and explosive power are all important for powerful kicking. Paulauskas

et al. (2025) determined that eight weeks of incremental elastic resistance training improved quality and physical performance of the roundhouse kick in taekwondo practitioners, providing strong evidence for a close relationship between technical and physical training. Neuromuscular coordination is a factor in developing kicking speed and control. More highly trained athletes recruit their muscles with greater efficiency. Likewise, Barramuño-Medina et al. (2025) showed that elite taekwondo athletes use a more efficient neuromuscular strategy than novice taekwondo athletes when performing a repetition roundhouse kick. Likewise, Sun et al. (2025) showed that lower-limb muscle activation was more efficient in elite than sub-elite taekwondo athletes. These results show practice leads to improvements in both external and internal performance through neuromuscular adaptation.

Fatigue affects the precision, speed and control of kicking. Therefore, technical quality may decrease during the course of a match as the player tires. Note that while some players have accurate, fast kicks, fatigue decreases control. Training for technique should be complemented with endurance training and repeated high effort. Taekwondo specific high intensity intermittent exercise has been shown to have both aerobic and anaerobic training demands (Bartel et al. 2022), indicating the need for conditioning to maintain technical skill throughout the match. Further research could compare kicking profiles between national and international players. In other words, international players could have this edge when it comes to accuracy, speed, and control of kick compared to national players, as international players would have been exposed to a higher level of competition and higher quality coaching and training. National players may have the foundation skills but just need to reach the international level. Hence, technical skilling is one of the dimensions of comparison.

Role of Balance, Coordination, and Body Movement

Taekwondo, the final fight style, features technical skilling such as balance, coordination, movement and other skills, in addition to a high number of different skills such as high kicks, turning movements, jumping, quick foot movement, defensive movements and counterattacks. These moves require a good balance and precision from the character, as a poorly timed or ill-executed kick has no effect. It involves the ability to control your center of mass, in relation to your base of support. Balance is key in Taekwondo before, during and after every technique. It is important for the player to maintain balance while moving, lifting the leg, rotating the hip, kicking the target, landing, and recovering. For this reason, the player is at risk of missing the target, falling over, or leaving themselves open for counterattack. Coordination is the ability to bring together various parts of the body to work together. The supporting leg, kicking leg, hips, trunk, arms, eyes and head must all work together. In the case of a roundhouse kick, if any one of the components moves on its own, the kick will be slow, unstable. The hip has to turn, the leg has to extend, the foot has to support and the trunk has to be controlled. Body movement determines where you go, body position, rhythm and flow. In taekwondo, players have to be able to move forward, backward, sideways, and diagonally. They have to be able to change direction quickly, to make angles and to control the distance, while being well coordinated and agile.

Balance is key in Taekwondo

- Support stable kicking: Balance helps maintain the stability of a player performing kicks at high speed.
- Improves recovery: The player can quickly return to guard position after attacking the opponent.
- Reduces fall risk: good balance helps avoid falls due to spinning, jumping, and turning.
- Supports defence: A balanced player can respond quickly when an opponent attacks.
- Improving confidence: A stable movement gives the player confidence in competition.
- The Importance of Coordination in Taekwondo
- Improves movement efficiency: synchronised movements now reduce excess energy.
- Increases kicking quality: Proper coordination improves speed, power, and accuracy.
- Supports combo attacks: Players can link together multiple attacks.
- Improves reaction: Coordinated players can respond faster to opponent movement.
- Helps injury prevention: Smooth movement reduces stress on joints and muscles.
- Body movements are important to Taekwondo
- Controls distance: Good movement allows the player to maintain a comfortable distance from the opponent.
- Creates attacking angles: Good body movement enables the creative player to find scoring opportunities.
- Support to defensive escape: The movement helps the player to escape.
- Improves tactical flexibility: A mobile player can change strategy during the match.
- Maintains the match rhythm: Controlled movement helps the player manage the match's pace.

Lower limb strength is also correlated to balance and motor control skills (Lazaro et al. 2017) because both feet are used when practicing taekwondo. Huang et al. (2025) found biomechanical laterality of the lower limbs during the execution of the competition taekwondo side kick. This suggests that strength and balance are developed in both feet. As such, both legs need to be trained well, or if one leg is stronger and/or more controlled than the other, the moves may be technically unbalanced.

Dynamic balance is also important, especially for taekwondo, when stability must be maintained when moving. Taekwondo athletes need dynamic balance while making sudden forward attacks, defensive footwork, turning kicks, jumping kicks, and counter-attacks. Yalfani et al. (2023) demonstrated that dynamic balance improved with foot orthoses in taekwondo athletes with flexible flatfoot. This indicates that balance is directly functional in movement quality. Dong et al. (2025) evaluated muscle function, dynamic balance, and injury risk factors in an adolescent taekwondo athlete cohort to highlight the importance of functional screening.

Good footwork is very close to balance and body control. With good footwork the player is able to enter and exit the range relatively quickly. It is used in attack and as defense. Good footwork keeps the player unpredictable to the opponent. However, if the player stays still, the opponent will be able to judge distance and timing much more easily, so movement becomes a technical weapon.

Balance, coordination, and body movement also play a role in energy expenditure. A player with poor body control uses much energy as movements are inefficient and uncontrolled. A technically skilled player is smoother and more economical in their movements and will thus be able to play at their best for longer. Taekwondo involves short bursts of high intensity activity, making movement efficiency important.

Skill related variables such as balance, co-ordination and body movement are probably the most important variables for the purposes of this study, but there may be a difference in these variables between national and international players. The study of technical skilling can determine if players from higher divisions have better control and movement efficiency.

Assessment of Technical Skill Performance in Taekwondo

To evaluate the actual performance of the technical skill of taekwondo players, an assessment of actual performance is necessary, so that coaches and researchers do not have to depend on observation and subjective judgment. In this way it gives evidence about the player's strengths, weaknesses and developmental needs. In the comparative study, assessment is even more important since it compares both national and international players in selected technical aspects.

Coach rating scale, questionnaire, performance indicators checklist, skill performance test, target based kicking test, video analysis, sparring observation, and sport-specific performance assessment have all been used to assess technical skill execution in taekwondo. Structured questionnaires, coach-based assessments, and performance indicators were identified in the uploaded synopsis as feasible assessment methods. These two components of technical ability, observable performance and experience based on training, account for the relevance of the techniques.

In addition to seeing whether the player can do a technique, the assessment should also evaluate how well the player is performing the technique. For example, the mechanics of a roundhouse kick should be analysed in addition to its precision, quickness, balance, control, and application in sparring, so the technical component of the skill should assess the quality and application of the skill.

Another technical assessment opportunity is via the coach rating. Coaches see players more frequently and have the chance to observe the technical quality, training discipline, technical control and competition readiness. To minimise subjectivity, a coach rating scale with items such as kicking accuracy, speed, balance, coordination, defensive skill and combination attack can be used to assess a player's performance. Another

method of sports performance assessment is a performance indicator. For example, a player may be asked to take a certain number of kicks at a target, and the number of accurate kicks is assessed. Kicking speed can be tested by time-based drills. Balance can be tested using drills that require the fighter to recover and continue moving, and combination skill can be tested in controlled sparring.

Another technical tool is video analysis. It gives the coach an opportunity to examine the posture of the body, the hip rotation, the guard position, the foot position, and the recovery. Modern taekwondo training is increasingly reliant on technology, including video analysis, allowing players to see and improve upon their errors. Athlete performance monitoring can be supported with cyber-physical systems (Cunha et al. 2024) and augmented reality-based coaching with real-time feedback can improve technical learning (Yang and Wang 2025), as can sport-specific performance protocols. Ölmez and Yüksek (2023) designed the Taekwondo Performance Protocol to assess technical speed and quickness in taekwondo because general fitness tests do not measure taekwondo skills, and a player can have excellent fitness levels but fail to be technically efficient in taekwondo skills. As a result, a taekwondo specific assessment would be more relevant, with performance under pressure. A player may practice well but fail to perform well in matches, so technical assessment should include both practice-based assessment and match-based evaluation. In sparring, one can compare skill sets and see how players can utilise their skills.

Emphasis on testing technical skills

- Identifies strengths and weaknesses: It shows the player their strengths as well as areas they need to improve.
- Supports training planning: Coaches create training sessions informed by the assessment results.
- Helps compare players: It allows for comparisons between players at national and international levels.
- Monitors progress: Regular assessment shows whether the player is improving over time.
- Improves coaching quality: Assessment provides proof of technical correction.
- Supports talent development: It helps to identify players with strong technical potential.

In Punjab, this study can help the coaches, academies and all sports associations to evaluate the technical skills of taekwondo players. If national players are found to have less technical control than international players, specific training may be designed to improve technical control. If their different strengths and weaknesses are taken into consideration, gender-sensitive forms of technical sport support can be developed. This means that technical analysis is not only important for research but also for practice.

VI. Conclusion

It may be concluded that technical skilling is one of the most important factors in Taekwondo performance. A player with good technical skill can perform kicks, defensive movements, counterattacks, footwork, and combinations with better accuracy, speed, balance, and control. Technical skilling is not developed naturally; it requires systematic training, repeated practice, expert coaching, correction, and competition exposure. International Taekwondo players are likely to show better technical maturity because they face higher-level competition and more advanced training environments. The study also indicates that technical skill assessment is important for identifying the strengths and weaknesses of players. Therefore, Taekwondo training in Punjab should focus on kicking accuracy, speed, balance, footwork, defensive response, counterattack, combination execution, video analysis, and coach-based feedback so that national-level players can improve their performance and move towards international standards.

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