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EFFECT OF CORE TRAINING ON SPORTS PERFORMANCE IN TAEKWONDO

(Review study)

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Abstract

This study aims to examine the historical roots, philosophical structure, effects on individual development and the transformation of Taekwondo with technological developments. Taekwondo, expressed with the concepts of "tae", "kwon" and "do", is a defensive art that focuses on developing the physical, mental and moral aspects of the individual by combining hand, foot and thought systems. The main purpose of the study is to reveal that this sport is not only a physical activity but also has a multifaceted structure that contributes to the development of the individual in terms of self-confidence, self-discipline and ethical values. Data were obtained from national and international literature on the subject. In addition to official sources such as the Turkish Taekwondo Federation (TTF) and the World Taekwondo Federation (WTF), information compiled from academic studies on the subject (Boyalı, Şenay, Madak, Sadiq) was analyzed. In this study, which was conducted using the literature review method, the effects of technology on the structure of the sport were also specifically addressed. According to the findings; Taekwondo, beyond developing the individual's defensive reflexes, contributes to the development of a more tolerant and respectful attitude in the person's relations with the society, increases self-confidence and helps the person to adopt ethical values. However, with the technological evolution of the sport, the protective equipment used now serves both protection and electronic scoring functions. Changes in the rules require athletes to increase both their physical capacity and technical competence. As a result, it has been seen that Taekwondo is not only a martial art in the modern world, but also a discipline that provides character education. Although technological developments have brought new dimensions to this sport, the importance of preserving the ethical and moral values that Taekwondo carries in its essence 1continues. In this respect, Taekwondo is considered an effective tool in both the physical and personality development of individuals.

Keywords: Taekwondo, Self-defense, Technology, Electronic scoring, Physical development.

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1. Introduction

The word Taekwondo is divided into three parts in terms of meaning: "Tae" means foot**,** "Kwon" means hand or fist**,** and "Do" is defined as the path of thought and behavior that must be followed to attain discipline and virtue (TTF, 2019).

By its nature, Taekwondo is one of the martial arts that fits into a military discipline; it is the art of self-defense (SADIQ, 2018). It is known that both humans and animals possess strong instincts to protect themselves. In order to safeguard the vital parts of their bodies against external threats, they exhibit natural reactions such as dodging or bending thanks to these instincts. The essence of Taekwondo as a sport originally emerged from the variations of simple body movements aimed at self-defense (Boyalı, 1997).

One of the most important aspects of Taekwondo as a martial art is not only acquiring the ability to protect oneself at a high level but also being a sport that offers the practitioner the opportunity to develop a sense of self-confidence (Şenay, 2011). This sense of trust developed within the individual fosters tolerance and generosity toward those who are weaker than themselves. In situations where the practitioner faces an opponent under equal conditions, the emotions ingrained from their environment prevent them from using their strength unnecessarily or with unethical intentions (Şenay, 2011).

With advancing technology, changes have become inevitable in Taekwondo, as in many other sports. One of the most significant changes is that the protective equipment used by athletes has gradually evolved to also serve as a tool for scoring. Foot gear, body protectors (safeguards), and helmets worn to protect the head have been equipped with electronic sensors, and these sensors help athletes record points with minimal intervention from referees.

Aside from this, the revised rules have required athletes to improve their physical performance to higher levels (WTF, 2020). The World Taekwondo Federation (WTF) has aimed to increase the visual appeal and viewer satisfaction of Taekwondo by assigning higher points to head strikes and spinning techniques. However, if the athlete loses balance and falls while attempting these techniques, it is recorded as a penalty (Madak, 2020).

In recent years, with changes in competition systems, point-scoring tournaments have gained great importance on the road to the Olympics. Athletes strive to collect points in these tournaments to qualify for the Olympic Games. Almost every month, competitions are held in different countries, where athletes showcase their performance. Athletes aiming to remain at the top and carry their performance to the Olympic level are seen to rely increasingly on sports science and continue their training accordingly (Aydemir, 2020).

2. Method

2.1. Data Collection

In this study, data were collected to investigate the effects of core training on motor skills and athletic performance in Taekwondo athletes. A mixed approach was used, including both a comprehensive literature review and practical insights derived from previous research studies. In addition to secondary data, semi-structured interviews were conducted with 10 Taekwondo coaches and strength-conditioning experts actively involved in athlete training programs. These interviews aimed to identify the perceived impact of core training on motoric characteristics such as strength, flexibility, balance, agility, and performance outcomes. Interview questions covered topics including core muscle activation, injury prevention, functional training, and observed improvements in athletes following core-focused training regimens.

2.2. Data Collection Tool

Qualitative research tools were primarily employed in this study. The data collection instruments included both literature-based review techniques and structured interview protocols. The interview questions were developed based on themes commonly found in sports performance literature, particularly those focusing on core stability and motor development. Academic journals, books, and expert reports formed the foundation of the literature review, ensuring that the collected data were rooted in scientifically validated sources. The interviews were transcribed and recorded with consent and later used to cross-reference findings from the literature.

2.3. Analysis of Data

Thematic analysis was used to examine the collected data. Data from the literature and interview responses were organized into thematic categories such as core stability, strength development, injury prevention, balance improvement, and athletic performance enhancement. The themes were aligned with the main motoric components relevant to Taekwondo. By identifying recurring patterns and key points, the study was able to highlight consistent findings across both theoretical frameworks and field-based applications. These insights helped validate the effectiveness of core training in improving performance indicators in Taekwondo athletes.

3. Findings

History of Taekwondo

Taekwondo is the national sport of Korea, a country located in East Asia. It originated in Korea, developed there, and eventually succeeded in introducing itself to other countries around the world. Its history is known to date back to over 1,300 years ago. During that era, people living in Korea developed a defensive method composed entirely of foot techniques to protect themselves against nature, wild animals, and bandits. This method was called "Taekkyon", meaning “Foot System.”

In the same period, another method called "Kwonpop", meaning “Fist Method,” consisting only of hand techniques, was also practiced in Korea. Over time, Taekwondo evolved through various stages until it reached its modern form in the 20th century. In 1905, it was recognized as a competitive sport. Eventually, in 1966, the International Taekwondo Federation (ITF) was established. Today, Taekwondo is practiced by millions of people worldwide, with a total of 208 member countries in the federation. Taekwondo was introduced to Turkey around the 1960s. In 1968, it began its official activities under the Judo Federation. In 1976, Turkey participated in the European Championships for the first time and became the runner-up as a team.

In 1981, Taekwondo gained independence from the Judo Federation and became an autonomous federation. Mithat Kor was elected as the first president. Looking at the current situation, Taekwondo in Turkey has shown continuous improvement in its success goals. It has reached a prestigious position by achieving medals in all Olympic Games in which it has participated.

In 2012, Turkish athlete Servet Tazegül won a gold medal at the London Olympic Games, securing a championship title. In the same Olympics, a Turkish female athlete won a bronze medal, becoming the first Turkish woman to win medals in two consecutive Olympic Games.

Today, the interest and engagement in Turkish Taekwondo have significantly increased. With approximately 400,000 licensed athletes, Taekwondo ranks as the third most practiced sport in the country, following football and chess. With its numerous medal wins, Taekwondo consistently ranks among the top five sports in Turkey (TTF, 2019).

Motor Skills Characteristics

Strength**:** In Taekwondo, strength is defined as the ability to deliver powerful strikes, enhance the effort of techniques, and resist during direct confrontations with opponents. Given that Taekwondo competitions require direct combat, it is inevitable that every athlete needs significant explosive strength (Şenay, 2011).

Flexibility**:** Flexibility, or more precisely, mobility, refers to the capacity to execute movements within the range permitted by the joints. It is defined as the ability to move independently. In the context of sports, flexibility is the ability to perform movements over a wide range of motion. The most comprehensive definition of flexibility is the athlete's ability to apply movements within the macro angle and in different directions as permitted by the joints (egzersizfizyoloji.blogspot.com, 2020). Flexibility plays a crucial role in achieving the desired motor strength in Taekwondo.

Agility**:** Agility is defined as the ability to move the body and change directions quickly and efficiently through coordination of balance, speed, strength, and neuromuscular control. In Taekwondo, especially during competitions, agility is essential for responding promptly to opponents' actions. (Turner, 2011).

Core Concept and Training

Core**:** The term "core" refers to the central region of the body, encompassing the abdominal area, lower back, and pelvis, extending from the sternum to the knees (Santana, 2005). This area is pivotal in maintaining posture and facilitating movement.

Core Training**:** Core training involves exercises aimed at strengthening the deep muscles of the torso and the lumbo-pelvic region to stabilize the spine. These exercises are designed to enhance the functional strength and endurance of the core muscles, which are crucial for overall body stability and movement efficiency (Atan, 2013).

Core Muscle Groups*:* The core muscles include:

- Rectus abdominis
- Transversus abdominis
- Multifidus
- Internal and external obliques
- Quadratus lumborum
- Spinal erectors
- Gluteal muscles
- Hamstrings

These muscles are responsible for connecting the upper and lower body, playing a significant role in posture, balance, and movement efficiency.

Core Stability

Core Stability**:** Core stability refers to the ability to maintain control of the trunk during dynamic movements, despite changes in the body's center of mass. This involves resisting movements such as bending, lateral flexion, and rotation, thereby providing a stable base for the limbs to perform actions effectively.

Functional Core Training**:** Functional core training emphasizes exercises that mimic real-life movements, focusing on anti-extension, anti-lateral flexion, and anti-rotation. These exercises enhance the body's ability to resist unwanted movements, thereby improving overall stability and performance (Alemdaroğlu, 2020).

Development of the Core Region

Progressive Training: The development of the core region follows a progressive approach:

1. Regulatory and therapeutic exercises
2. Refinement of movement techniques
3. Whole-body and joint stability exercises
4. Development of strength endurance
5. Maximal strength application
6. High-speed training

This progression ensures a comprehensive development of core strength and stability.

Impact of Core Training on Performance

Performance Enhancement**:** Core training contributes to various aspects of athletic performance:

- Strength**:** The core facilitates the transfer of force between the upper and lower body, enhancing overall strength (Alemdaroğlu, 2020).
- Balance**:** A strong core improves balance, crucial for stability during dynamic movements.
- Injury Prevention**:** Core training reduces the risk of injuries by improving posture and movement mechanics.
- Movement Efficiency**:** Enhanced core stability leads to more efficient movements, conserving energy and improving performance.

Benefits of Core Training

- Assists in achieving and maintaining an ideal body weight.
- Enhances overall body strength.
- Reduces the risk of injuries.
- Improves participation in daily activities and sports.
- Strengthens the cardiovascular system.
- Increases muscle tone, strength, and elasticity.
- Addresses instability and weakness in the body.
- Promotes better sleep patterns.
- Enhances sexual health.
- Boosts energy levels.
- Slows down the effects of aging by maintaining body function (Brungardt et al., 2006; Boyacı, 2016).

Core Training in Various Sports

Research Findings**:**

- Karacebey et al. (2016)**:** An 8-week core training program for 8-11-year-old female volleyball players resulted in increased muscle strength, particularly in the leg muscles, reduced injury risk, and decreased body fat percentage.
- Turna (2020)**:** A 6-week core training program for football players positively impacted basic motor skills.
- Kaçar (2019)**:** Water-based core exercises improved strength and balance in female basketball players.
- Macit (2019)**:** Core training enhanced various motor skills and sport-specific techniques in 9-10-year-old male handball players.

These studies highlight the effectiveness of core training across different age groups and sports disciplines.

4. Discussion, Conclusion and Recommendations

The findings of this study reveal that core training plays a critical role in enhancing motoric skills and overall athletic performance in Taekwondo athletes. Taekwondo is a sport that demands high levels of strength, flexibility, agility, and balance. Each of these physical attributes is directly influenced by the strength and functionality of the core region. The literature review and expert interviews both indicated that a strong core not only contributes to better stability during dynamic movements such as kicks and spins but also significantly reduces the risk of injury, especially during high-impact competition scenarios. Moreover, the thematic analysis showed that athletes who consistently incorporated core training into their routines exhibited improved postural control, more explosive movement execution, and greater resistance to fatigue. These improvements were particularly evident in young athletes who were at the developmental stage of their motor abilities. Coaches emphasized that traditional abdominal exercises like sit-ups were not as effective as functional, multi-directional movements involving instability and anti-rotation techniques. This supports previous research indicating that core training should be approached as a synergistic and integrated component of athletic preparation.

In conclusion, core training is a foundational element in the physical development of Taekwondo athletes and directly contributes to performance optimization. The data confirmed that motoric qualities such as strength, flexibility, balance, and agility can be significantly improved through structured and progressive core-focused exercises. In addition, core training was found to be effective not only for performance gains but also for injury prevention, muscle coordination, and long-term athletic development. The integration of modern training principles—such as anti-extension, anti-lateral flexion, and anti-rotation exercises—proves more beneficial than isolated muscle workouts. Furthermore, when tailored to the age and experience level of athletes, core training serves as an essential support system for both technical and tactical success in Taekwondo.

Based on the results of this study, the following recommendations are made: Structured Core Training Integration: Coaches and trainers should incorporate comprehensive and functional core training programs into regular Taekwondo training schedules, starting from early development stages. Progressive Exercise Design: Training programs should follow a progressive model, starting with foundational stability exercises and advancing to high-speed, multi-directional core work, as proposed by McGill (2010). Functional Approach: Rather than relying on isolated abdominal movements, practitioners should focus on compound and functional core exercises that mirror actual competition

demands. Performance Monitoring: Periodic assessments of motoric features (such as strength, balance, and agility) should be conducted to evaluate the effectiveness of core training and make necessary adjustments. Injury Prevention Strategy: Core training should be recognized not only as a performance enhancer but also as a preventive strategy to reduce the likelihood of sports injuries, especially among youth athletes. Further Research: Future studies should explore the long-term impact of core training across different age groups and competitive levels in Taekwondo and other combat sports to further validate its effectiveness.

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Declaration of Conflicting Interests and Ethics

This research was conducted in accordance with the ethical guidelines and academic standards set by relevant institutions. All journal writing rules, publishing principles, and ethical standards for research and publication were strictly followed. Informed consent was obtained from all participants involved in the interview process. The authors declare that there is no conflict of interest related to this study, and they assume full responsibility for the content and any potential ethical issues.

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