Abstract

Purpose: The purpose of this study is to explore essential technical training plans for Taekwondo freestyle Poomsae and present systematic and specialized training plans to instructors. In order to achieve this research purpose, this study was conducted using a qualitative approach.

Method: The purpose of this study is to explore essential technical training plans for Taekwondo freestyle Poomsae and present systematic and specialized training plans to instructors. In order to achieve this research purpose, this study was conducted using a qualitative approach of literature review and in-depth interviews.

Results: First, 1) jump side kick (Leap training using high speed, obstacle crossing training, and repetitive exercise to raise one’s leaping foot to the thigh) 2) jump front kick (Training of kicking the first foot at the same time of the leap, the snap kick training in a sitting position, and the training to hit a target) 3) rotating kick (Stride training, holding the axis of rotation training, two-way rotation training) 4) consecutive sparring kick (Step training using a jump rope, repeating knee raising training, and various tactical training in actual sparring competitions) 5) acrobatic movements (Handstand training and training for using the strength of the upper body with push-ups). Second, as training for injury prevention, leap, and landing, strength exercises (squat, conventional deadlift, leg press) to improve posture balance and irregular physical training that changes heart rate to check the heart rate of actual competition situations are to be conducted. Third, efforts should be made to create a stable training environment for freestyle Poomsae training by providing equipment and tools such as air mats and landing mats for the athletes to stably train essential skills of freestyle Poomsae.

Conclusion: For each of the five essential skills of Taekwondo freestyle Poomsae, an efficient training method suitable for the characteristics of the skill is needed. In addition, players and instructors who train freestyle Poomsae need to improve their posture balance through training on high leaps and landing to prevent injuries. In addition, it is important to create a training environment suitable for the characteristics of the event for efficient training of freestyle Poomsae athletes.

[Keywords] Taekwondo, Freestyle Poomsae, Essential Skills, Training Program, Poomsae Players

1. Introduction

Taekwondo is a traditional martial arts of Korea that has been developed with Korean history and is a cultural heritage of Korea that has been recognized for its value and excellence based on its rapid spread around the world[1].

After the Taekwondo Hanmadang event, the Korean Taekwondo Association newly enacted the Poomsae game rules in 2006, and Poomsae was adopted as an official event in the Taekwondo competitions. Since then, Poomsae has begun to be adopted as an official event at international compe-
tions such as the World Taekwondo Poomsae Championships and the Summer Universiade. In addition, there are continuous movements to adopt Taekwondo Poomsae as an official sport in each continent’s sports competitions[2].

Free Poomsae was included as a demonstration event at the 6th World Poomsae Championships held in Vladivostok in July 2011. Since then, at the 7th World Poomsae Championships held in December 2012 in Tunja, Colombia, freestyle Poomsae has been adopted as an official event and the game has been held(Jeong Hyeon-do, 2015). Since then, after the Taekwondo Poomsae event was adopted at the 18th Jakarta-Palembang Asian Games, a new freestyle Poomsae with both official Poomsae, competition Poomsae, and freestyle Poomsae with music and creativity was newly introduced[3]. The Taekwondo freestyle Poomsae game time is more than 90 seconds and less than 100 seconds. The scoring criteria are divided into technique (6 points) and performance (4 points). The detailed items of the technical score are the difficulty of the kick, the accuracy of the movement, and the completeness of the Poomsae. There are a total of four detailed items of the performance score, consisting of creativity, coordination, expression, and music and choreography. Essential standing movements are tiger stance, crane stance, and back stance, and they must be included in the performance regardless of the order.

Free Poomsae must follow these rules and demonstrate, and must include jump side kicks, jump front kicks, rotating kicks, consecutive sparring kicks, and acrobatic movements. It belongs to the detailed standard items of technical scores, and 1 point is allocated to each item. Essential techniques should be constructed in the order indicated in the scoring table. Among the essential techniques, the high-level rotating kicks and acrobatic movements have to be demonstrated in the third and fifth order, which is a heavy physical burden to the players. In addition, players are having difficulty training because there are many ambiguous parts in the game rules for essential skills of freestyle Poomsae.

According to the Korea Taekwondo Association’s rules of competitions[4], rules on jump front kicks state that in principle, it is necessary to kick above the waist level after a leap, and scores are given according to the number of kicks and accuracy during a leap. However, the waist level referred to in the rules is insufficient to explain whether it is waist level when standing or after taking a leap. In addition, in the case of rotating kicks, due to the ambiguous scoring standard of “angle of rotation,” it is unclear whether players should pay more attention to rotating than to the height of the kick and where the rotation begins. Therefore, many players kick by adjusting the starting point of rotation and rotating with less angle of 900 degrees than 720 degrees.

According to Ryu[5], since the existing rotating kick evaluation criteria consist of only accuracy and rotation, it was emphasized that considerations for aerial motion, point deduction, kick height, etc. were insufficient, and specific difficulty classification and clear evaluation criteria for essential techniques should be prepared.

Looking at previous studies on Taekwondo Free Poomsae game rules and scoring regulations, studies on problems and improvements in freestyle Poomsae game and scoring regulations include [2][3][6][7][8][9][10]. Thus, research on the direction of improvement and development of the freestyle Poomsae competition continues, but research on training methods for essential techniques is still very insufficient.

In particular, there are no books or studies suggesting training methods for essential skills for freestyle Poomsae. The essential skills of freestyle Poomsae get high scores and require expertise in various fields such as Taekwondo demonstration skills, sparring, and acrobatic movements, making it difficult for athletes and instructors to train essential skills. Therefore, this study aims to study the systematic training of freestyle Poomsae essential skills to improve players’ skills, prevent injuries that may occur in the process of performing high-level skills, and suggest professional and systematic training plans.

2. Research Method
The purpose of this study is to explore essential technical training plans for Taekwondo freestyle Poomsae and present systematic and specialized training plans to instructors. In order to achieve this research purpose, this study was conducted using a qualitative approach.

First, a literature review was conducted on the evaluation and improvement of Taekwondo freestyle Poomsae, and previous studies related to training methods for improving performance, to analyze the freestyle Poomsae evaluation method, improvement method, and to derive efficient training plans.

Second, we visited the study participants directly or conducted in-depth interviews through phone calls. Based on the opinions of freestyle Poomsae players and instructors, the method of qualitative research was used.

2.1. Research participants

As a specific method of selecting the research subjects, purposeful sampling, one of the nonprobability sampling used in qualitative case studies, was used. The purposeful sampling method is to sample subjects who can represent characteristics in situations suitable for research themes and is a method of obtaining in-depth information from research participants who are judged to be suitable for research purposes[11].

Participants in the study were five players with winning experience in the national-scale freestyle Poomsae competition organized by the Korea Taekwondo Association, Kukkiwon, and the World Taekwondo Federation, and five instructors with more than three years of freestyle Poomsae coaching experience. The reason why of choosing them as research participants is that we judged that teaching methods and training methods will be important factors in this study as they are the most representative of freestyle Poomsae essential technical training. It was selected with the advice of a group of experts. Specific personal information of the study participants is shown in Table 1 and Table 2 below.

Table 1. Personal background of the study participants <player>.

<table>
<thead>
<tr>
<th>Name</th>
<th>Gender</th>
<th>Age</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Player A</td>
<td>Male</td>
<td>20’s</td>
<td>Won a national competition</td>
</tr>
<tr>
<td>Player B</td>
<td>Male</td>
<td>20’s</td>
<td>Won a world competition</td>
</tr>
<tr>
<td>Player C</td>
<td>Female</td>
<td>20’s</td>
<td>Won a national competition</td>
</tr>
<tr>
<td>Player D</td>
<td>Male</td>
<td>20’s</td>
<td>Won a national competition</td>
</tr>
<tr>
<td>Player E</td>
<td>Female</td>
<td>30’s</td>
<td>Won a national competition</td>
</tr>
</tbody>
</table>

Table 2. Personal background of the study participants <instructor>.

<table>
<thead>
<tr>
<th>Name</th>
<th>Gender</th>
<th>Age</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructor A</td>
<td>Male</td>
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<td>10 years</td>
</tr>
<tr>
<td>Instructor B</td>
<td>Female</td>
<td>30’s</td>
<td>7 years</td>
</tr>
<tr>
<td>Instructor C</td>
<td>Male</td>
<td>20’s</td>
<td>5 years</td>
</tr>
<tr>
<td>Instructor D</td>
<td>Male</td>
<td>20’s</td>
<td>4 years</td>
</tr>
<tr>
<td>Instructor E</td>
<td>Female</td>
<td>20’s</td>
<td>4 years</td>
</tr>
</tbody>
</table>

2.2. Measuring tool

2.2.1. In-depth interview

This study collected data using the in-depth interview method. Interviews, the most commonly used method for qualitative research, are planned and formalized in advance to induce information and statements of the interviewee. It is divided into various forms according to the structural system,
from structured, semi-structured, and unstructured interviews, and is divided into one-on-one interviews, group interviews, or telephone interviews according to the subject or method[12].

This study consisted of questions that excluded flexibility in the interview using a semi-structured interview method. However, it is being used as a desirable way to elicit a deeper response by using an open question to ask a series of structured and organized questions prepared in advance and then obtain deeper information[13]. The contents collected through in-depth interviews were recorded using a voice recording device after obtaining consent from the study participants, and all the recorded contents were recorded and used in notes.

2.2.2. Questions

The in-depth interview questions were based on questions about essential skill training plans according to the evaluation items of the Taekwondo Free Poomsae competitions and questions about exploring safe training plans for current freestyle Poomsae essential skills. The contents of the question are shown in <Table 3>.

<table>
<thead>
<tr>
<th>Area</th>
<th>No.</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training method</td>
<td>1</td>
<td>What do you think is important during the training for jump side kicks?</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>What do you think is the training for the leap and accuracy of jump front</td>
</tr>
<tr>
<td></td>
<td></td>
<td>kicks?</td>
</tr>
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<td></td>
<td>3</td>
<td>What is the training for the angle of rotation and the height for rotating</td>
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<td></td>
<td></td>
<td>kicks?</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>What do you think is the training method to increase the speed and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>expressiveness of consecutive sparring kicks?</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>What do you think is the training plan and basic training for high-level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>technologies such as acrobatic movements?</td>
</tr>
<tr>
<td>Injury prevention</td>
<td>6</td>
<td>What do you think is the training and method to prevent injuries during</td>
</tr>
<tr>
<td></td>
<td></td>
<td>freestyle Poomsae training?</td>
</tr>
</tbody>
</table>

2.3. Data analysis and reliability verification

2.3.1. Transcription

This study went through the process of transcribing data collected through in-depth interviews. Transcription is a process of systematically recording data recorded through in-depth interviews with research participants. The in-depth interview data were recorded using the recording function of the voice recording device, and all contents were transcribed and recorded after recording.

2.3.2. Inductive analysis

This study was analyzed using an inductive content analysis method. Inductive content analysis is a process of inferring certain conclusions through close interpretation of unstructured data and is a method of systematically and objectively identifying the characteristics of data by reinterpreting the characteristics of the message implied by the data[14].

In order to increase the reliability of the research results, triangular verification was conducted to increase the reliability of the recorded contents through a meeting with experts.

2.3.3. Reliability verification

In order to minimize the problem by carefully considering various ethical issues in the process of this study, it was conducted through the following procedure.
First, research participants in this study were selected as subjects who voluntarily expressed their intention to participate.

Second, the purpose and procedure of this study were sufficiently explained to the study participants, and the use of the voice recording device during the interview was explained, and consent was sought, and then carried out.

Third, the personal information of the participants was made anonymous, and all data collected through interviews were promised not to be used except for the purpose of the study.

3. Results and Discussions

3.1. Training method for essential kicks in freestyle poomsae

3.1.1. Jump side kick (jump height improvement training)

According to the Korean Taekwondo Association's rules [4], the jump side kick of the Taekwondo Free Poomsae gives points as much as the height of the jump. The height of the side kick is not accurately stated, but in the end, a high score is given to the player who leaps high and performs the side kick accurately.

"Jump side kick is a leap kick and a kick that requires a high jump to get a high score, so I practice kicking high when I leap, which is the basis of all leap kicks. The speed of running forward is important, so I train to jump up while maintaining the speed of running." (player D).

In interviews with research participants consisting of athletes, they commonly mentioned that as a training method for jump side kicks, training for strengthening muscle strength for a high leap, as well as practicing raising the height of the running foot quickly at the time of a side kick.

"In the case of the jump side kick, I think the side kick, which is the basic kick of Taekwondo, is the most important, so I train a lot of side kicks. After taking a leap, pull up the upper and lower bodies together to secure aerial position, and folding the knee at a high speed to perform a side kick. At the same time, it uses the waist to maximize the expression of the side kick. And a training for a safe and stable landing is also repeated. Athletes usually practice jumping at the right time between the legs that push the ground and the legs that lift up." (instructor A).

Among the interviews with players and instructors, the commonly mentioned content emphasized the importance of muscle training to increase the height of the jump side kick. This is consistent with the study of Heo [15], who reported that training to improve the maximum muscle activity of lower extremity muscles such as squats, conventional deadlift, and leg press and training for Taekwondo freestyle side kick are effective.

The difference between the interviews between the player and the instructor is that the players had little mention of the side kick itself prioritizing the height of the jump side kick, while the instructors emphasized the importance of the kick posture in the air. In addition, the instructors mentioned the timing of raising the height of the running foot when performing a side kick. To summarize the commonalities and differences between players and instructors, there are training to leap forward and training to raise the height of the running foot.

First, it is judged that high leaps with only muscle strength and elasticity can strain the lower body, and it is possible to make high leaps with little force using speed. This is consistent with the research results of Shin [16], who reported that one could make a high leap if one was skilled in converting horizontal energy into vertical energy by running at a high speed. Therefore, for the timing of the moment that leads to running speed and leap, it is important to train to leap at the same time with the foot that pushes the ground.

Second, as a training to raise the height of the running foot, the training is repeated to support the body with the arm to raise the leaping leg fast to the thigh of the kicking leg. Even if one takes a high leap forward, if one fails to raise the lower leg, the height may look low at the moment of the highest body position of the jump side kick. The training method of installing obstacles in front, jumping over, and performing jumping side kicks is also effective. This is consistent with Ahn [9]
claim that training to jump over obstacles and perform jump side kicks is effective in raising the leap-
ing foot.

3.1.2. Jump front kick (the number of kicks)

Jump front kick is a technique in which you run fast toward a target, leap with one foot, and kick forward with the leaping foot. Taekwondo Free Poomsae’s jump front kick is scored according to the number of kicks performed above the waist height[4].

"I think speed is the most important part of my jump front kick training. If there is no significant physical difference, I think the aerial position is also similar. So I think raising the speed of the front kick in a similar aerial position is a way to do a jump front kick well. When training for speeding up, I don’t stretch my legs, rather kicking them with a snap. I often practice kicking fast while lying down as well." (player C).

In interviews with research participants composed of athletes, it was emphasized that the practice of kicking in a lying position or on the floor, not in the air, was important as a jump front kick training. Regarding the speed of the kick, the importance of snap kicks with folding and stretching knees and kicks on a target to enhance the expressiveness of kicks were mentioned.

"The number of kicks is an important point in scoring, so we practice kicking the first kick at the same time as we leap. If you can kick the first kick at the same time as you leap, you can kick one to two times more than other players, which will be a great advantage to get a better score. As soon as one jumps, one kicks, and secondly, training for snap kicks with the knee fold and stretched while the thigh fixed. It’s a front kick snap practice using the straightening force. If you move your thigh, the kick comes out big, but you should be careful because the kick itself slows down and you may feel severe pain in your thigh." (instructor E).

In the interviews with the player and the instructor, the accuracy of the kick was mentioned in common. They said they train to kick with targets to increase the accuracy of kicks. Summarizing the commonalities and differences between players and instructors, it is divided into jump front kick’s high leap and accuracy training, training for more kicks after jumps, and training to prevent thigh injuries[17][18].

First, for the high leap of the jump front kick, it is judged that training to rush forward quickly and to jump at the timing of the leg pushing the ground is necessary for a high leap. However, unlike the jump side kick, the body may bend forward due to speed when taking a leap forward using a high speed, so one has to be aware that if the hip falls back, the expressiveness of the kick decreases.

Second, for the accuracy training of the jump front kick, it is necessary to sit on the floor and kick rapidly crossing the feet. In addition, training to jump front kick while supporting the body to learn the sense in the air is also considered effective.

Third, in order to kick more, there is training to kick the first kick at the same time as the leap. When the first kick begins from the peak of the leap, a large number of kicks cannot be made, so it is judged that training is needed to push the ground and do the kick with a snap at the same time as taking a leap.

Fourth, as a training plan against thigh injury, it is judged that the knee should be fixed as much as possible during aerial movements, and the front thigh should be stretched enough before and after jump front kick training to prevent injury.

3.1.3. Rotating kick (the angle of rotation)

Rotating kick is a technique that takes a step in the basic posture and rotates from the leap of a dolgae kick to kick. Acording to the Korean Taekwondo Association’s rules of the competition[4], a score is given depending on the angle of rotation.

"I think the key is how well I’m keeping my balance during the fast rotation. I don’t think it’s best to practice rotating a lot, but to train focusing on how well you hold the axis of the rotation after jumping. At first, you have to find the step that suits you, and it’s good to give similar strength to the leg that pushes the ground. If either side is stronger, the axis collapses. I think I get a lot of injuries that twist my ankle while landing without stopping the rotation." (player B).
Participants in the study, consisting of athletes, said they were training with an emphasis on catching the axis of rotation of the rotating kick among the essential skills of Taekwondo Free Poomsae.

"I train them a lot to hold the axis of the rotation. I don’t think kicking in a rotation that doesn’t work is not a good training method, so I check each player on the limitations of his or her rotation and let them practice kicking harder in turn or back kicks according to the rotation. Of course, in order to increase rotational power, we use a band to exercise muscle strength using only their shoulders, but since the rotating kick is a kick anyway, they tend to focus on kicking using rotation rather than just turning itself. Next, we train them to land. Both 720 degrees and 900 degrees of spin kicks are techniques that use rotation, so landing without stopping rotation can strain your ankles or knees. So, we train them to control their body after kicking in the air and land accurately." (instructor E).

Among the interviews between the player and the instructor, the common point was training to set the axis of rotation as the top priority. They said that high leaps, rotational power, and kick training are meaningless without holding the axis. On the other hand, the players emphasized training for an easy rotation by practicing a lot on the ground while the instructors emphasized the importance of rotational force, speed and power of kicks, and stable landing.

The commonalities and differences in training between athletes and instructors are divided into training for stride, the axis of rotation, leap, torque, the height of kick, stable landing, and lower body strength.

First, it is considered important to find a stride suitable for the rotation kick for the player. This is consistent with the arguments of Ryu[10], who reported that the stride was large as soon as the rotating foot touched the ground and that the time required for the landing section was long. This means that the distance and posture of the stride should be the most comfortable position for the player to leap forward, and it is important to lighten the allocation of the center so that the rotating foot can strongly push up the ground.

Second, for the rotating kick’s rotational power and leap power, training to adjust the timing of rotation with the legs pushing the ground is considered important. It is believed that high leaps and fast rotational power will be obtained through training that takes both leaps and turns at the same time.

Third, as a training plan to increase the expressiveness of the kick, it strengthens the waist rotation just before the kick to create room to twist the hip, and the moment it kicks, it turns the hip upside down and kicks. It is believed that it will increase the expressive power of the kick through training to accelerate the kick using rotational force, not stretching the foot in rotation.

Fourth, it is judged that physical training is important because it is recognized that it is physically difficult at the time of demonstration of a rotational kick in freestyle Poomsae. In addition, it is judged that training preventing injuries of ankles and knees that occur during rotating kicks is necessary to be accompanied by lower extremity muscle exercise and posture balance training.

3.1.4. Consecutive sparring kick

As a training method for the speed and expressiveness of the consecutive sparring kicks, the following is the content of interviews with research participants composed of players.

"I practice a lot for the steps. If you learn various steps such as forward step, backward step, side step, and foot change and practice kicking by connecting them, your expression will improve." (Player A).

Participants in the study, consisting of athletes, mentioned the importance of steps as an important training method for the consecutive sparring kicks of Taekwondo Free Poomsae.

"I make them jump rope a lot. Instead of jumping with two feet, continue to train jumping rope one foot by one foot. By jumping rope, you learn how to understand the steps with your body and make you have a sense of jumping fast and short, so that you can easily train the sparring steps. After that, we train them to practice kicking using mitts." (instructor A).
What the interviews between players and instructors have in common was that they emphasized the importance of steps. Players mentioned training that focuses on step kicks, while instructors mentioned training based on strategies and tactics of actual sparring competitions. Ahn[9] reported that in the case of sparring kicks, connectivity is important, so they learn practical skills and hitting sense using the target and train. Therefore, training is required to hit targets for connection and accuracy of kicks, strategy based on actual sparring competitions, and tactical kick training to increase the diversity of consecutive sparring kicks, lighten the sparring steps through jump rope, and lay the foundation for faster kick connection.

3.1.5. Acrobatic movements

According to the Taekwondo Free Poomsae rules, acrobatic movements refer to all acrobatic movements used in gymnastics events and must include kicks and score according to the difficulty level[4].

“I usually train to make a strong round-off. If you can't do a round-off, you can't leap and rotate. I train a lot to practice jumping high by pulling my foot hard from the side, and I do kicks when I'm used to it enough. Slowly increase the number from 1 to 5. There was a time when I was in a hurry and couldn't rotate, so I practiced with enough care now.”(player C).

Participants in the study emphasized the importance of round-off and training of pulling their feet to do well in acrobatic movements. In addition, in the case of kicks, he said that he would start with 1 kick and up to 5 kicks to practice the accuracy of the kicks. In common, caution was emphasized regarding injuries from landing.

“For the efficient round-off, which is the most important part of the acrobatic leap, we train handstand to push the ground with hands, pull the legs, and stand up in a good posture. The force that raises the upper body and the force of the lower body that pulls meet to make a leap, and if you take that leap and kick in the air, you will get good acrobatic movements. Of course, we practice kicking accurately with snap kicks to express accurate kicks at a high speed. Make sure your upper body rotates to train your eyes to look at the ground. That way, you can land safely. Above all, we need to create an environment where we can practice acrobatic movements safely. Air mats or landing mats must be properly prepared and trained safely so that training players can train without any burden.”(instructor A).

What the interviews between players and instructors have in common is that professional training in round-off, which is the basis of acrobatic movements, is necessary. For safety reasons, they emphasized the need for landing mats and air mats to help them leap, and mentioned the need to create an environment where players can train comfortably without worrying about safety issues. On the other hand, it is said that they train with an emphasis on kicks after taking a leap forward.

First, it is judged that posture correction training of round-off for a safe and high leap is necessary. This means that handstand is the basis and training is needed to raise your feet in a straight line so that you can maintain the power to run forward, and it is important to make the best posture to make a high leap by pulling your belly and legs just before jumping[19].

Second, in order to make the leap higher, it is believed that the upper body should be raised through push-up training, which is upper-body reinforcement training, and the leg-pulling force from the handstand position to make a high leap forward to perform acrobatic movements.

Third, for the accuracy and expressiveness of the kick, it is necessary to train the front kick in a lying position. It is also necessary to do core training together so that you can balance your body in the air and kick accurately.

Fourth, it is recognized that balance ability and ankle stability are important to perform safe and perfect Taekwondo movements. This is consistent with a study by Jang and Ahn[20] that high levels of balancing ability are required because leaps and landing movements are repeatedly performed in freestyle Poomsae. Therefore, it means that Taekwondo freestyle acrobatic movements should be trained together with combined exercise(squat, conventional deadlift, and leg press) to improve posture balance skills that help leap and land.
4. Conclusion and Recommendations

The purpose of this study is to explore essential technical training plans for Taekwondo freestyle Poomsae and to present more efficient, stable, and systematic training plans to athletes and instructors. Participants in the study were 5 male/female freestyle Poomsae athletes aged 20 or older and 5 instructors with more than 3 years of freestyle Poomsae coaching experience as subjects of the study, and conducted in-depth interviews through semi-structured questions, and drew the following conclusions.

First, Taekwondo freestyle Poomsae essential skills training plan is as follows. 1) Jump side kick: Leap training using high speed, training to raise the foot together with the jumping foot, training to raise the height of the foot beyond the obstacle, and repeated training to support the body with the arm and then raise the foot to the thigh; 2) jump front kick: Training to kick the first kick at the same time as the leap, training the accuracy of the kick after sitting or holding the rod, repeating the snap kick to speed up the kick, and training the sense of hitting the target; 3) rotating kick: Training to make the legs and body vertical to hold the axis of rotation, training to balance the body by training both directions so that the rotation does not lean in one direction, sensory training using the speed of rotation, and stride training suitable for the player; 4) consecutive sparring kick: Step training in various situations(forward, backward, both sides, diagonal), sensory training of steps using a jump rope, knee lifting repeated training for the speed of kicks, various tactical training in actual competition situations, and kicking targets for the expressiveness of kicks; and 5) acrobatic movements: Handstand training for accurate posture of round-off(training to make a line from arm to leg and push the ground all over the body), pulling the belly and legs from handstand to get the momentum needed for a leap, training to use the upper body's strength in push-ups, and kicking while lying down.

Second, in order to prevent injuries to players and instructors who train freestyle Poomsae, it is necessary to improve their posture balance through training on high leaps and landing after leaps. Muscle exercises according to this include squats, conventional deadlifts, and leg presses. Through physical training, they train at the same heart rate as when they actually participate in a competition through training that changes their heart rate with irregular rhythms rather than a certain pattern, and finish with walking(maintaining a certain heart rate) training during breaks. Massages after training can help blood circulation, relaxing both body and mind[21].

Third, it is important to create a training environment suitable for the characteristics of the event for efficient training of freestyle Poomsae athletes. First of all, air mats should be equipped to help leap in acrobatic movements that require high leaps, correct posture in the air, learn senses, and compensate for wrong kick posture. It is also important to secure enough space to run in order to train for a high speed and leap during the jump kick training. Taekwondo freestyle Poomsae essential technical training should try to create a training environment where athletes can feel emotional stability in a safe space[22].

This study explored Taekwondo freestyle Poomsae essential skills training plan and conducted research on professional and systematic training plans for athletes and instructors, and based on the results of this study, the following suggestions are made for follow-up research on freestyle Poomsae.

First, as a follow-up study of the results of this study, it is judged that specific research on improving skills and improving performance through essential technical training is necessary.

Second, it is judged that there is a need for research on the systematic use of measures to prevent injuries by Taekwondo freestyle Poomsae athletes.

Third, it is necessary to study how to use the training facilities and equipment of gymnasts for the training of freestyle Poomsae athletes to create a training environment for them.

5. References
### 5.1. Journal articles


### 5.2. Thesis degree


[16] Shin HC. Comparison of Kinetic Characteristics of Taekwondo Jumping Front kick(Run up, Take Off and Kicking) according to Skill Levels. Korea University, Doctoral Thesis (2016).

### 5.3. Books


### 5.4. Additional references
6. Appendix

6.1. Authors contribution

<table>
<thead>
<tr>
<th>Initial name</th>
<th>Contribution</th>
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<tr>
<td>Lead Author</td>
<td>MS</td>
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<tr>
<td></td>
<td>-Set of concepts ☑️</td>
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<tr>
<td></td>
<td>-Design ☑️</td>
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<td>-Getting results ☑️</td>
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<td>-Analysis ☑️</td>
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<td>-Make a significant contribution to collection ☑️</td>
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<td>-Final approval of the paper ☑️</td>
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<td>-Corresponding ☑️</td>
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<td>-Play a decisive role in modification ☑️</td>
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<tr>
<td>Corresponding Author*</td>
<td>KJ</td>
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<td></td>
<td>-Significant contributions to concepts, designs, practices, analysis and interpretation of data ☑️</td>
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<td>-Participants in Drafting and Revising Papers ☑️</td>
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<td>-Someone who can explain all aspects of the paper ☑️</td>
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