

Efficacy of Static and Dynamic Distance Perception on Kumite Performance in Karate

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Abstract: These experiments were conducted to investigate the Efficacy of Static and Dynamic Distance perception on Kumite performance in Karate. Subjects were 11 (8 males and 3 females) undergraduate and graduate students from the University of Tsukuba Karate team (Japan) and were divided into 3 groups (2 experimental and 1 control). Dynamic group (n = 4), Static group (n = 4), Control group (n = 3). The two experimental groups (dynamic and static) after Kihon part (fundamental skills) did distance perception exercises for 20 minutes. Analysis; for the analysis of the data the researcher used the Japanese edition of the JUMP program. (ANOVA, Means, Standard Deviation and Percentages) ACE: (Absolute Constant Error) is the absolute value of the distance away from (error) the target required. Results indicated that distance perception (static and dynamic) applied to both experimental groups lead to improvements in distance perception and kumite performance. The dynamic experimental group had a better result in distance perception and kumite performance than the experimental static group.

Key words: Karate • Kumite • Distance perception • Static • Dynamic

INTRODUCTION

Karate is a competitive martial art stressing the importance of mental discipline concurrent with courage and skill. Throughout the ages Karate has evolved not only to become an effective self-defense method but also to turn into an exciting sport [1].

Karate sport is characterized by rapid and Continuous changes of the playing positions. It demands from the players' rapid programming of the situations for each process of defense and attack. It also demands high level of ability for accurate choice of different motor actions from physical fitness components which require extreme level of control.

The kinesthetic perceptions play a significant role in developing the corresponding processes related to complex movements which require the distinction between its different parts and the precise control in the performance while keeping correct positions.

The individual becomes aware of his environment through his senses. The changes in his internal as well as external environment excite his senses which in turn affect his nervous system so that he can recognize the fact [2].

Our muscles have a superior ability to our eyes in recognizing various facts which oblige us to rely on our kinesthetic perceptions to perform our active duties [3].

During any motor actions the players tend to be in different positions depending on specific distances that require in turn specific motor skills corresponding to the players' positions.

The players' distance perception in accordance to the borders of the competition area, opponent and the referee plays a significant role in choosing suitable motor skills and tactics for different circumstances. Distance Perception is one of the most important kinesthetic perceptions for kumite players and controls scoring points and match results.

In spite of its importance the training methods did not contain any exercises to develop it, which in turn is leading to a drop in the performance level.

MATERIALS AND METHODS

Subjects were 11 (8 males and 3 females) undergraduate and graduate students from the University of Tsukuba Karate team (Japan) and were divided into 3 groups (2 experimental and 1 control). Dynamic group (n = 4), Static group (n = 4), Control group (n = 3).

Experimental Protocol: The two experimental groups (dynamic and static) after Kihon part (fundamental skills) did distance perception exercises for 20 minutes.

Table 1: Characteristic of Subject. N=11

	Age (years)	Weight (Kg)	Height (cm)	Arm length (cm)	Leg length (cm)	Flexibility (cm)	Power (cm)	SMR (Num)	SML (Num)
Average	21.73	65.06	168.00	72.50	97.82	13.45	210.91	14.73	15.09
SD	2.01	9.87	7.60	4.28	3.71	4.91	38.52	0.65	1.14

SMR= speedy movement to right hand.

SML= speedy movement to left hand.

Distance Perception Exercises These exercises were prepared based on three principles.

The first principle: (The difference between static distance and dynamic distance)

Where the static distance Perception exercises were built on performing the exercises “on one constant distance” in every stage, while the dynamic distance Perception exercises were built on performing the exercises “on variable distances” in every stage.

The second principle: (Isolating the sense of vision)

Based on the subject of both groups performing, the exercises in the beginning while seeing. In this case the sense of vision in association with the other senses helps the individual to realize and understand the nature of the motor action. Later the individuals are blindfolded to isolate the sense of vision which leads to an increase in the level of the other senses and the concentration and imagination capacities.

The third principle :(The gradual increase in the difficulty of training)

The researcher designed the exercises taking into consideration the degree of difficulty in the distance Perception and the performance, starting from the most basic exercises and moving on to very difficult ones according to these stages:

- Normal steps exercises.
- Forward stance steps exercises.
- Forward stance steps exercises with technique.
- Kumite stance steps exercises.
- Kumite stance steps exercises with technique.
- Kumite moving stance steps exercises.
- Kumite moving stance steps exercises with technique.

The previous stages were derived from the theory of motor behavior that consists of 4 steps:

Step 1: The collection of Perception s

In which the individual makes a visual experiment to choose the motor performance components and the necessary tools to act

Step 2: The interaction of Perception s

In which the individual compares the stocked Perception information with the newly available Perception information

Step 3: The motor actions

In which the individual a part of the motion systems move in accordance with a brain order

Step 4: Comparison of Perception information

In which the individual depends on the available Perception information from the muscles and the other Perception centers to perform. The control group did the traditional kumite training. (4)

Tools

Pre-test: Distance perception and kumite performance (attack and match).

Test During the Experiment: Forward stance steps, kumite stance steps and kumite moving stance steps.

Post- Test: Distance perception and kumite performance (attack and match).

Analysis: For the analysis of the data the researcher used the Japanese edition of the JUMP program. (ANOVA, Means, Standard Deviation and Percentages)

ACE: (Absolute Constant Error) is the absolute value of the distance away from (error) the target required.

RESULTS AND DISCUSSION

Figures 1 and 2 represent ACE for distance perception tests for both right and left legs show statistically significant differences between the pre and post-test results for both experimental groups (static and dynamic) in favor of post-test results. The reported results for the right leg were pre (2.25 cm) and post (0.45cm) and for the left leg were pre (3.13) and post (0.53) for the dynamic group and the reported results for the

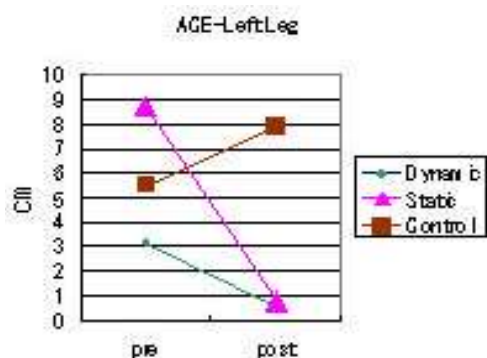


Fig. 1: ACE distance perception

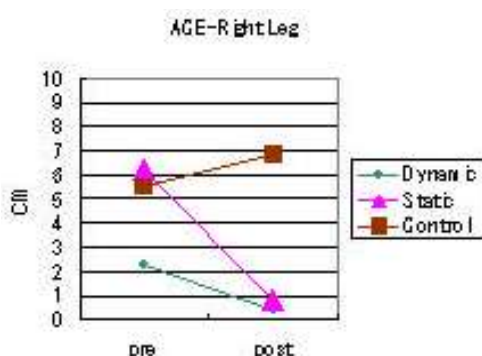


Fig. 2: ACE distance perception test for Left leg. test for Right leg.

right leg were pre (6.25) and post (0.83) and for the left leg were pre (8.75) and post (0.75) for the static group. While there was a difference between the pre and post-test results for the control group the difference was in favor of the pre test the reported results for the right leg were pre (5.50) and post (6.83) and for the left leg were pre (5.50) and post (7.90). When we compare the post test results of the three groups we find that there are statistically significant results in favor of both experimental groups. We also found a difference (however not statistically significant) between the two experimental groups in favor of the dynamic group.

Figures 3 and 4 represent attack and match for Kumite performance show statistically significant differences between the pre and post-test results for both experimental groups (static and dynamic) in favor of post-test results. The reported results %for the attack were pre (2.50) and post (55.00) and for the match were pre (13.50) and post (58.00) for the dynamic group and the reported results for the attack were pre (6.50) and post (47.50) and for the match were pre (8.25) and post (56.25) for the static group. There was also a difference (however not statistically

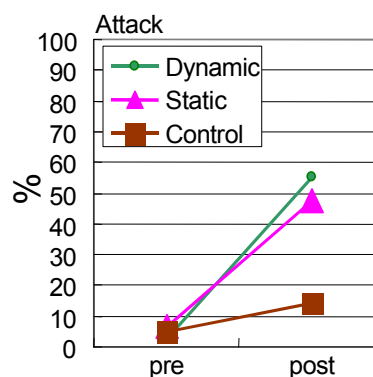


Fig. 3: The Improvement percentages

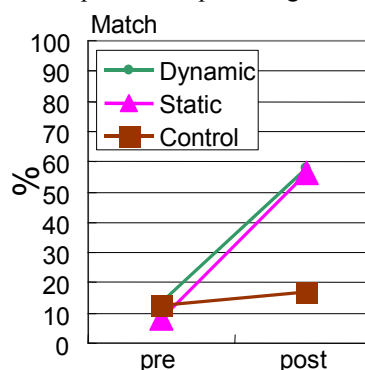


Fig. 4: The Improvement percentage for the attack performance for the match performance.

significant) between the pre and post-test results for the control group in favor of the post test. The reported results for the attack were pre (4.67) and post (14.33) and for the match were pre (12.67) and post (16.67). When we compare the post test results of the three groups we find that there are statistically significant results in favor of both experimental groups. We also found a difference (however not statistically significant) between the two experimental groups in favor of the dynamic group.

DISCUSSION

The researcher explains the difference between the two experimental and the control groups to distance perception exercises which affected importantly the individuals in both experimental groups. However, there was no positive effect on the individuals of the control group which agrees with Ali Rehan's conclusion that training programs void of various perception exercises have no direct effect on these perceptions and any effect registered is actually completely coincidental [5].

The other differences between both experimental groups (static and dynamic in favor of the dynamic group) are also explained by the nature of the dynamic perception exercises that depend on the continuous change of the distance during the training which leads to an increase in the perception of the various distances and the ability to concentrate by way of varying the perception information and the continuous comparisons between different performances.

Once more the researcher attributes the results of the difference between the two experimental and the control groups to distance perception exercises that affected the viewing perception of the player of the outer environment and empowered him to judge the exact distance for both attack and defense processes and take the correct stances. Therefore, his skilled performance became more effective and lead to scoring more points which agrees with Shoukeir [6] concluding that the distance perception gives the ability to distinguish between the close and far objects, while the absence of this ability leads to problems in positioning the body in the right place for better effective performance.

As it is difficult for the individual to see all the parts of his body at once and since Karate players need to move more than one part of their body at once it is therefore not possible to reach the highest level of performance without the highest level of perception.

The distinguished importance of perceptions in improving the motor actions of the players as the motor action performance is directly related to the improvement in the muscle perception [7].

The other differences between both experimental groups (static and dynamic in favor of the dynamic group) are also explained by the obvious similarities between the dynamic distance perception exercises and the nature of the performance, because the performance conditions varies continuously which directly influences the variation of distances agreeing with Vetmeil and Heland [8], observing that the method of training to improve the performance in competition has to be similar to the competition itself.

The previous results agree with Ferrie [9] interpretation that true Karate is related to what we call Zen in the Japanese culture which is an enlightenment condition that organizes body and mind in addition to boosting sense, control, confidence and all other qualities by way of realizing those meanings. The previous coincides with the definition of the Masters that Karate is a condition of spiritual peace.

CONCLUSION

Distance perception (Static and Dynamic) applied to both experimental groups lead to improvements in distance perception and kumite performance.

The dynamic experimental group had a better result in distance perception and kumite performance than the experimental static group.

Recommendations: Use a part of the daily training for improving the different perceptions of the players with a deepening of the understanding of these concepts by them and pointing their importance because the true nature of Karate is based on Zen derived from Japanese culture that emphasizes the senses and the mental abilities of Karate players.

Additional research should be done on other types of senses and their effect on the level of performance.

The future research can follow the same procedures and methods used in this study as they proved to be very successful.

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