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THE EFFECT OF WEIGHT TRAINING AND REACTION SPEED ON GYAKU TSUKI PUNCHES IN INKANAS SELAYAR KARATE SPORTS

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ABSTRACT

This study aims to look at the effect of weight training and the hand reaction speed of the Gyaku Tsuki Punch on Inkanas Selayar Karate Sports. This type of study is a 2x2 factorial experiment. The research population included all Karate sports from Inkanas Selayar, with a total of 70 research samples. The sampling technique utilized the entire population, and the group division was based on matching ordinal pairs. The data analysis techniques used in this study were the 2x2 factorial analysis technique and the Tukey test with SPSS version 20.00 at the significant level of 95%, or α 0.05. The analysis revealed that: (1) Increasing the number of push-ups has a significant impact on gyaku tsuki stroke in Karate Sports of lnkanas Selayar, as evidenced by an increase in the mean from 19.8000 to 35.2500, with an observation of -16.359 > ttable 2.093 and the significant value 0.000 < ± 0.05; (2) There is an influence of pull-up training on gyaku tsuki stroke in Karate Sports oflnkanas Selayar, as proven by the increasing of the mean from 19.6500 to 39.1000 with tobservation -22.093 > ttable 2.093 and the significant value 0.000 < α 0.05. (3) Fcount 94.111 indicates a significant difference between push-up and pull-up training on the gyaku tsuki stroke in Karate Sports of Inkanas Selayar. The ttable value is 2.093, indicating a significant difference between push-up and pull-up training on the gyaku tsuki stroke in Karate Sports of Inkanas Selayar. ttable = 4.113 or significant value 0.000 < α 0.05, (5) there are differences of influence of gyaku tsuki stroke between high reaction speed groups by using push-up training and pull-up training with significant value 0.000 < α 0.05, and the high reaction speed trained by using pull-up is better than using push-up exercise, and (6) there are differences of gyaku tsuki stroke between low reaction speed groups by using push-up workout and pull-up training with significant value 0.000 < α 0.05, and the low reaction speed trained by using push-up is better than using pull-up exercice.

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1. INTRODUCTION

Sport is an activity that can never be separated from routine human activities every day, such as walking, running, cycling, dancing, and so on (Van Tuyckom & Scheerder,

2010; Siedentop & Van der Mars, 2022). Increasing and expanding participation is crucial for instilling a love of sports and forming a sports culture, or sports science, in society (Asnaldi, 2015). Karate is an exercise that involves carrying out movements of all parts of the body, such as bending, jumping, maintaining hand-eye coordination, going forward and backward, moving left and right, and up and down uniformly and freely (Andibowo et al., 2022). Karate techniques that are acquired and mastered well by a karateka, according to his preferences, will naturally direct movements towards the right target and are full of energy. The essence of karate technique lies in the concept of decisive movements, called kime, which are attacks or defenses launched with maximum force in the shortest possible time. Kime can be done using the hands to attack or defend, as well as the feet to kick or block attacks (Trisnar Adi Prabowo, 2020).

Like other martial arts sports, karate involves a series of movements that combine physical and technical elements, with these two elements supporting each other. Without adequate physical conditioning, it can be challenging to develop effective techniques, and conversely, without strong technical skills, your physical strength may not be at its peak. In the context of the sport of karate, there is a foundation or basis called Kihon in Japanese. This kihon is the basic element that forms a technique; it usually consists of a series of basic movements that form the basis of various more complex techniques (Muhibbi et al., 2018).

Push-ups are a form of weight training that can be done using your own body weight; in other words, the load given is an internal load. This exercise is very good for developing the wrist, elbow, triceps, brachial, and chest muscles (Saparuddin, 2019). During push-ups, the muscles at the shoulder, wrist, and elbows are involved in this joint movement. At the shoulder joint, the front deltoid muscles and the pectoralis major muscles, also known as the chest muscles, extend from the clavicle (collarbone) and the upper part of the scapula (shoulder blade) through the shoulder to the upper arm (Purba, 2014).

Pull-ups are a very effective upper-body exercise that can be done using your own body weight. Muscular endurance refers to muscle groups that are able to maintain static contractions for long periods of time, such as in hanging situations, holding weight with straight arms, or hanging with legs bent at the knees. Hanging can be done by holding tightly to an object or by hooking the legs in a certain position. The hanging body lift exercise aims to train the strength and endurance of the arm muscles. Although most people use their hands, not everyone can do one-handed pull-ups and chin-ups. One-arm pull-ups are a challenging exercise and require consistent practice to achieve (Prabowo et al., 2020).

Usually, these reaction components are better known as reaction speed, reaction time, and reaction time. "Reaction or reaction speed is the body's ability to react as quickly as possible when there is stimulation received by somatic, kinesthetic, or vestibular receptors" (Devianto, 2020). This reaction is the body's ability to carry out kinetic activity immediately due to a stimulus received by the receptor (Hudain et al., 2024). Runners, racers, cyclists, and short-distance swimmers, if they start late due to slow reaction times, will lose valuable time, which is one of the main causes of fatigue. With

proper training, the time required by the stimulus, from the sound of the gun going off being heard by the five senses of the ear to the nerve center, will be shorter (Hudain & Ishak, 2020).

Reaction is a person's ability to act immediately, as quickly as possible, in response to stimuli coming through the senses, nerves, or feelings." Reactions in karate include anticipating the ball's arrival to catch, reacting quickly when hit or kicked, and avoiding blows. This includes elements like balance, coordination, and agility. So the reaction component is better provided in each branch's training program (Suparman & Hasbillah, 2021).

According to the author's observations in every karate match, the punch technique is the most commonly used. This is because attacks using punches are easier to get points or values compared to using other techniques (kicks). Punches in karate consist of several techniques, such as oi tsuki, cudan punches, kizami tsuki, gyaku tsuki, and others. However, in this study, the punching technique referred to is the gyaku tsuki punching technique, or direct and reverse punches. The Gyaku tsuki punch is a straight punch forward towards the middle target (cudan, stomach, or uluhati).

Weight training plays a vital role in increasing the effectiveness of gyaku tsuki punches. To achieve fast, powerful, and accurate punches, appropriate weight training for the arms is necessary. In other words, the absence of adequate weight training on the arms can result in weakness in the execution of the punch, which in turn affects the overall speed and power of the punch. However, it is important to remember that weight training is not the only factor that contributes to optimal striking results in karate martial arts. There are also various other factors that play a significant role in increasing the effectiveness of a punch. However, the author's emphasis in this research is on exploring weight training methods to maximize the strength and speed of gyaku tsuki punches (Badaru et al., 2024).

Apart from adequate weight training for the arms, hand reaction speed also plays an important role in the execution of gyaku-tsuki punch combinations. This is because hand reaction speed reflects the body's or limbs' ability to respond quickly to stimuli received by somatic, kinesthetic, or vestibular receptors. By considering the points outlined above, it can be assumed that the quality of weight training and the level of reaction speed of a karateka's hands have a significant impact on the speed and precision of executing gyaku tsuki punch combinations in the context of sport karate.

The author's observations during the execution of gyaku tsuki punches at INKANAS Selayar Karate-ka indicate that they have not yet reached their maximum speed and accuracy. Therefore, when performing a combination of Gyaku Tsuki punches, it is essential to engage in weight training for the arms and monitor the speed at which the hands react to the punches.

2. METHOD

Experimental research is the type of research conducted. According to Sudaryono, experimental research is the only research method that can truly test hypotheses regarding causal relationships (Iskandar & Wirno, 2021). The variables studied were: a)

independent variables, namely push-up exercises and pull-up exercises; b) the dependent variable is the gyaku tsuki punch; and c) the attribute variable is the reaction speed, which is divided into high reaction speed and low reaction speed.

A population is a collection of units whose characteristics will be studied; if the population is too large, then the researcher must take a sample (part of the population) for research." Therefore, the population in this study consisted of all 70 Inkanas Selayar karate athletes. Therefore, based on this concept, the sample used in this research was 70 Inkanas Selayar karate athletes (Sugiyono, 2013).

After these samples were obtained, an initial reaction speed test was then carried out, and the initial test results were divided into two groups of 20 athletes each, taking 27% of the total population of each group. Next, we formed two groups: one with a high reaction speed and the other with a low one. We rearranged the group division results based on ranking and then divided them into two balanced groups, each comprising 10 athletes. The group division used the marching ordinal pairing technique (Sepdanius et al., 2019).

The test instruments used are: 1) the hand reaction speed test using the ruler grasp test; and 2) the gyaku tsuki punch test with a time of 30 seconds (Hudain & Ishak, 2020).

3. RESULTS AND DISCUSSION

Results

1. Results of the influence of push-up training on gyaku tsuki punches in the Inkanas Selayar Karate Sport

In the push-up training group, we analyzed the pretest and posttest data for the gyaku tsuki punch at the Inkanas Selayar Karate Sport using a paired t-test. It can be concluded that the push-up training group has a significant influence on the gyaku tsuki blows at Inkanas Selayar Karate Sports. The observation value is -16.359, which is greater than the t-table value of 2.093 (-16.359 > 2.093), with a significant value of 0.000, which is smaller than α0.05. Therefore, we reject Ho and accept H1, indicating a difference between the initial pretest and the final posttest. Therefore, it can be concluded that push-up training has a significant influence on gyaku tsuki punches in the Inkanas Selayar Karate sport.

It can be proven that the posttest average value is higher than the pretest average value, or (μA1 19.8000 < μA2 35.2500), with a difference of 15.45. Therefore, it can be concluded that push-up training has a significant influence on gyaku tsuki punches in the Inkanas Selayar Karate sport.

2. The effect of pull-up training on gyaku tsuki punches in the Inkanas Selayar Karate Sport

We analyzed the pretest and posttest data of the gyaku tsuki punch at the Inkanas Selayar Karate Sport using a paired t-test in the pull-up training group.

It can be concluded that the pull-up training group has a significant influence on the gyaku tsuki blows at Inkanas Selayar Karate Sports. The observation value was -22.152, which was greater than the ttable value of 2.093 (-22.152 > 4.302) with a significant

value of 0.000, which was smaller than α0.05. Therefore, we reject Ho and accept H1, indicating a significant difference between the initial test (pretest) and the final test (posttest). Therefore, it can be concluded that pull-up training has a significant influence on gyaku tsuki punches in the Inkanas Selayar Karate sport.

It can be proven that the posttest average value is higher than the pretest average value, or (μA1 19.6500 < μA2 39.1000), with a difference of 19.45. Therefore, it can be concluded that pull-up training has a significant influence on gyaku tsuki punches in the Inkanas Selayar Karate sport.

3. Differences in the effect of gyaku tsuki punches on groups trained using push-up exercises and pull-up exercises

Based on the summary of the variance analysis calculations, as presented in table 4.8 above, it is evident that the Fcount between columns (FA) = 94.111 appears to be greater than the Ftable = 4.113. The results indicate that the Fcount is greater than the Fcount, with a P-value of less than 0.05, leading to the rejection of H0 and the acceptance of H1. Thus, it can be concluded that overall, there is a significant difference in influence between push-up training and pull-up training on gyaku tsuki punches in the Inkanas Selayar Karate sport.

In other words, the results of gyaku tsuki punch training using pull-up training (mean = 39.1000 and standard deviation = 5.01472) are better than the results of push-up training (mean = 35.2300 and standard deviation = 2.55209). Thus, the first research hypothesis states that, overall, the results of gyaku tsuki punch training using pull-up training are better than push-up training.

4. Interaction between push-up training, pull-up training, and reaction speed to gyaku tsuki punches in the Inkanas Selayar Karate Sport

The summary of the variance analysis calculations can be seen above in Table 4.8. It shows that Fcount interaction (FAB) = 297.921 and Fcount = 4.113. It looks like Fcount > Ftable or P-value = 0.000 < 0.05, which means that H0 is not true and H1 is true. In other words, the gyaku tsuki punch's achievement can be determined by the interaction between push-up training, pull-up training, and reaction speed.

Based on the research data, the average score for the gyaku tsuki strokes of the group trained in push-up training with the high reaction speed group was 33.2000 and the low reaction speed group was 37.3000. The average score for gyaku tsuki strokes for those trained in pull-ups with the high reaction speed group was 43.9000, and the low reaction speed group was 34.3000. Thus, the research hypothesis states that push-up training, pull-up training, and reaction speed have an interaction with the gyaku tsuki punch in the Inkanas Selayar Karate sport.

5. Differences in the effect of gyaku tsuki punches between groups with high reaction speed who were trained using push-up exercises and pull-up exercises

According to the summary of the Tukey test calculation results, the difference between Gyaku Tsuki punches, which have high reaction speed and are trained using

push-up exercises (A1B1) and pull-up exercises (A2B1) with a P-value of 0.000 is greater than 0.05.

Based on the average score of the two groups, the results of the gyaku tsuki punch test for samples with high reaction speed who were trained using pull-up exercises were 43.3000, better than those trained using push-up exercises, which were 33.2000. Thus, it was concluded that there was a significant difference in the influence of gyaku tsuki punches on samples that had high reaction speed using push-up exercises and pull-up exercises. The sample gyaku tsuki punch, which has a high reaction speed, is trained using pull-up training (A2B1), which is higher than the push-up training method (A1B1).

6. Differences in the effect of gyaku tsuki punches between groups with low reaction speed who were trained using push-up exercises and pull-up exercises

The difference between gyaku tsuki punches, which have low reaction speed, trained using push-up exercises (A1B2) and pull-up exercises (A2B2) with a p-value of 0.000 is greater than 0.05.

Based on the average value of the two groups, it was found that the gyaku tsuki punch of the sample with low reaction speed, trained using push-up training, was 37.3000 more effective than those trained using push-up training, which were 34.3000. Thus, it was concluded that there was a significant difference in the effect of gyaku tsuki punches on samples that had low reaction speed and were trained using push-up exercises and pull-up exercises. The sample gyaku tsuki punches that have low reaction speed are trained using push-up exercises (A1B2), which are higher than pull-up exercises (A2B2).

Discussion

The study examines the impact of push-up training on gyaku tsuki punches in the Inkanas Selayar Karate Sport

The first hypothesis is accepted: there is a significant effect of push up training on gyaku tsuki punches in the Inkanas Selayar Karate Sport. According to the t-test results of the initial test data and final test data of the gyaku tsuki blows at the Inkanas Selayar Karate Sports in the push up training group, it turns out that from the calculation results it was obtained that the observed t value was greater than the t table value at the 95% significance level. This proves that the first hypothesis proposed is accepted at a significance level of 95%. The prediction that can be made is that by providing systematic, programmed push up training, you will be able to improve your gyaku tsuki strokes. This proves that push up training plays a role in improving the gyaku tsuki punch. The pull up stance movement is the body facing the floor with elbows straight, palms shoulder width apart (or slightly wider). Rotate your hands 30-45 degrees, so that your elbows are pointing out. Keep your body straight in one line from head to toe. Slowly lower until your chest touches the floor. Then, push your body up until your arms are straight and your elbows are locked. Keep your body straight throughout the movement and do it repeatedly. The link between the push up training movement in performing the gyaku tsuki punching movement is that the pull up training movement is a movement that can increase the strength and endurance of the arm muscles because

in karate the important role is the arm muscles. Therefore, in order to produce strength and endurance in the arm muscles, pull up exercises are needed. Thus, push up training has a significant influence on the gyaku tsuki punches in the Inkanas Selayar Karate Sport.

The effect of pull-up training on gyaku tsuki punches in the Inkanas Selayar Karate Sport

The second hypothesis is accepted: pull-up training has a significant effect on gyaku tsuki punches in Inkanas Selayar Karate. Based on the t-test results of both the initial and final test data for the gyaku tsuki blows in the pull-up training group at Inkanas Selayar Karate Sports, it was found that the observed t value exceeded the t table value at the 95% significance level. This demonstrates that the second hypothesis proposed is accepted at a 95% significance level. The prediction that can be made is that by providing systematic, programmed pull-up training, you will be able to improve your gyaku tsuki strokes. This proves that pull-up training plays a role in improving gyaku-tsuki strokes. The pull-up movement is an exercise for arm muscle strength performed on a single bar. The method is to hang both hands on the single bar, then lift the body by bending the elbows so that the chin is above the single bar. The connection between pull-up training movements and performing Gyaku Tsuki punches lies in the fact that pull-up training movements can enhance the strength and endurance of the arm muscles. This is because the sport of karate, particularly Gyaku Tsuki punches, requires strength to produce harder punches. Therefore, to produce strength and endurance in the arm muscles, pull-up exercises are needed. Thus, pull-up training has a significant influence on the gyaku tsuki blows in the Inkanas Selayar Karate sport.

Differences in the effect of gyaku tsuki punches on groups trained using push-up exercises and pull-up exercises

Both push-up and pull-up exercises are well-known and frequently utilized. Both push-up training methods and pull-up training methods have the same goal. In the push-up training method, the body is facing the floor with a straight elbow, and the two palms are separated as wide as the shoulder (or slightly wider). Turn your hands in 30-45 degrees, so the elbows go out. Make sure to align your body in a straight line from head to foot. Slowly lower until the chest touches the floor. Then, push the body up until the two arms are straight and the elbows are locked. The push-up exercises also enhance the strength of various muscles, including the major pectoralis muscles, anterior deltoids, rhomboidus, trapezius, coracobrachialis, anterior serratus, biceps, and triceps.

While pull-up exercises are a type of exercise that can increase the strength and endurance of the arm muscles, Pull-up exercises for arm muscle strength are performed on a single bar. The exercise involves hanging both hands on a single bar, then lifting the body with a bent elbow to position the chin above the bar. The main purpose of this exercise is to train the strength of the hand muscles. Pull-up movements can strengthen muscles such as the lantissimus dorsimus, the upper back muscles that stretch from the

back of the middle to the lower part of the body and under the armpits, as well as the trapezius muscles, which are located from the neck to both shoulders.

Based on the explanation above, the pull-up training method is better than the push-up training method. Because the Pull Up Exercise Method involves more intense exercises than both push-ups and pull-ups, it enhances the strength of the arm muscles, making it easier for athletes to perform a harder Gyaku Tsuki. Thus, based on the study's findings, it can be recommended that the pull-up training method be more suitable for increasing the Tsuki Gyaku Punch.

Interaction between push-up training, pull-up training, and reaction speed to gyaku tsuki punches in the Inkanas Selayar Karate Sport

The equation a x b represents the relationship between load training methods and reaction speed. This means that the load training method and reaction speed together influence the increase in Gyaku Tsuki's punch.

Groups of athletes with high reaction speed that are trained using pull-up exercises get better results in Gyaku Tsuki blows compared to the athlete group with the same reaction speed capability that is trained using push-up workouts. Older groups with low reaction speed capabilities trained using push-up exercises get better Gyaku Tsuki blows compared to athlete groups with low reaction speed capabilities who are trained using pull-up workouts. This demonstrates that the impact of push-up and pull-up exercises correlates with the athlete's reaction speed during the Gyaku Tsuki blow exercise.

Karate is an empty-hand martial art that uses both hands and feet systematically. If an opponent attacks suddenly and surprisingly, the practitioner will master both hands and feet using a demonstration similar to a real weapon. It is important for coaches to develop training programmes that can train mental focus abilities and eye focus skills. The following is an explanation of the interaction (relationship) of the push-up exercise method, the pull-up training method, and the reaction speed of the Gyaku Tsuki blow. The two exercise methods can boost Gyaku Tsuki's blows. Despite having both high and low reaction speeds, they positively interact to enhance Gyaku Tsuki's punch power. The results of the analysis above indicate that both exercise methods interact, influencing the Gyaku Tsuki athlete's punch in accordance with the principles of training.

Therefore, to enhance Gyaku Tsuki's blow, athletes with a high reaction speed should utilize the pull-up exercise method, while those with a low reaction speed should train using the push-up exercise method.

Differences in the effect of gyaku tsuki punches between groups with high reaction speed who were trained using push-up exercises and pull-up exercises

In its implementation, the push-up training method involves the body facing the floor with a straight elbow, with the two palms separated as wide as shoulder width (or slightly wider). Turn your hands in 30-45 degrees, so the elbows go out. Make sure to align your body in a straight line from head to foot. Slowly lower until the chest touches the floor. Then, push the body up until the two arms are straight and the elbows are

locked. Keep the body straight during the movement; do it repeatedlThe push-up exercises also enhance the strength of certain muscles, including the major pectoralis muscles, anterior deltoids, rhomboidus, trapezius, coracobrachial, anterior serratus, biceps, and triceps.ps.

Pull-up exercises, in terms of implementation, are a type of exercise that can increase the strength and endurance of the arm muscles. Pull-up exercises for arm muscle strength are performed on a single bar. The exercise involves hanging both hands on a single bar, then lifting the body with a bent elbow to position the chin above the bar. The main purpose of this exercise is to train the strength of the hand muscles. Pull-up movements can strengthen muscles such as the lantissimus dorsimus, the upper back muscles that stretch from the back of the middle to the lower part of the body and under the armpits, as well as the trapezius muscles, which are located from the neck to both shoulders.

It appears that after being given these two exercises and the Gyaku Tsuki punch test, the average value of the sample group that was trained using the pull-up training method was better than the sample group that was trained using the push-up training method, although the two groups had different speeds. The pull-up training group exhibited a similar high reaction rate, likely due to its more rigorous nature compared to push-up exercises, and its ability to enhance the strength and endurance of the arm muscles. While Gyaku Tsuki's punch requires good strength to produce stronger results, it also requires a good reaction speed, making it difficult for opponents to anticipate their blows. Based on the previous discussion, it is recommended that alts with a high reaction speed apply the pull-up exercise method to enhance their Gyaku Tsuki blow.

Differences in the effect of gyaku tsuki punches between groups with low reaction speed who were trained using push-up exercises and pull-up exercises

Both push-up and pull-up training methods have the same goal, namely, to increase the strength and endurance of the arm muscles for gyaku tsuki punches. For this reason, both push-up and pull-up exercises are suitable for improving gyaku tsuki strokes, as they serve as key supporting factors. But these two exercises also have differences in terms of implementation.

In its implementation, the push-up exercise method requires that the body face the floor with the elbows straight and the palms of the hands shoulder-width apart (or slightly wider). Rotate your hands 30-45 degrees so that your elbows are pointing out. Keep your body straight in one line from head to toe. Slowly lower until your chest touches the floor. Then, push your body up until your arms are straight and your elbows are locked. Keep your body straight throughout the movement and do it repeatedly. The push-up exercise movement also increases several muscles, such as the pectoralis major, anterior deltoid, rhomboidus, trapezius, coracobrachialis, serratus anterior, biceps, and triceps.

Meanwhile, in terms of implementation, pull-up training is a type of exercise that can increase the strength and endurance of the arm muscles. The pull-up exercise is an arm muscle strength exercise performed on a single bar. The method is to hang both hands

on the single bar, then lift the body by bending the elbows so that the chin is above the single bar. The main purpose of this exercise is to train hand muscle strength. The pull-up movement can strengthen muscles such as the latissimus dorsi muscle, which is the upper back muscle that stretches from the middle of the back to below the shoulder blades and under the armpits, and the trapezius muscle, which is the muscle that is located from the neck to both shoulders.

In the sport of karate, especially the gyaku tsuki punch, training is needed to increase strength so that the results of the punches are stronger. For this reason, push-up and pull-up exercises are needed. Both exercises can increase arm muscle strength and endurance. According to the research results, athletes who have low reaction speed require more effective training, such as push-up training, because this exercise is still easy, and the athlete will not be burdened. If they use harder training, the athlete will easily get tired, and the reaction speed will not increase.

Thus, based on the discussion above, it can be recommended that for athletes who have low reaction speed, the push-up training method be suitable for improving the gyaku tsuki punch.

4. CONCLUSION

Based on the results and discussion, it can be concluded that:

1. There is an influence of push up training on gyaku tsuki punches in the Inkanas Selayar Karate Sport.
2. There is an influence of pull up training on gyaku tsuki punches in the Inkanas Selayar Karate Sport.
3. There is an influence of push up training and pull up training on gyaku tsuki punches in the Inkanas Selayar Karate Sport.
4. There is interaction between push up training, pull up training and reaction speed to gyaku tsuki punches in the Inkanas Selayar Karate Sport.
5. There is a difference in the effect of gyaku tsuki punches between high reaction speed using push up exercises and pull up exercises in the Inkanas Selayar Karate Sport.
6. There is a difference in the effect of gyaku tsuki punches between low reaction speed using push up exercises and pull up exercises in the Inkanas Selayar Karate Sport.

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