

The Impact of 8 Weeks Training with Resistance Band in a Special Period towards the Improvement of the Legs Power of Taekwondo Athletes

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Abstract: This research is aimed to determine the impact of 8 weeks training with resistance band in a special period towards the improvement of the legs power of taekwondo athletes. This research used quasi experimental research with research design "Control Groups Pretest-Posttest Design". The population of this research were 18 athletes at the Tamanan Dojang Yogyakarta City. The writer used purposive sampling technique, with certain criteria, namely (1) the athletes at the Ekadanta Dojang Magelang City who are still active in joining the exercise, (2) male, (3) minimum attendance of 75% during the treatment, (4) able to follow all the program that had been prepared, (5) can do the combination kick correctly. Based on those criteria, there were 10 athletes who fulfilled the requirements. The instrument of legs power used margaria kalamen test. The writer used t test significance level of 5%. The result showed that there are significant impact of 8 weeks training with resistance band in a special period towards the improvement of legs power of taekwondo athletes, with t count 6.234 > t table 2.776, significance value of 0.003 < 0.05, and percentage improvement of 12.35%. It can be concluded that 8 weeks training with resistance band in a special period has an impact towards the improvement of legs power of taekwondo athletes.

1 INTRODUCTION

Taekwondo is a martial art that uses a lot of techniques. One of the techniques that really needs to be strengthened is kicking. Kick is a very dominant technique in taekwondo and even taekwondo is very well known for its strengths in kick techniques. As revealed by Suryadi (2002: 32), "kicking techniques are very dominant in senior taekwondo martial arts, and there must be those who need taekwondo very much for their strengths. in kick technique ". In taekwondo sports, kicks are the main weapon in attacking to get victory points.

Taekwondo matches are divided into two numbers, namely Poomsae and Kyorugi numbers. Poomsae is an art that demonstrates movement in taekwondo. At this number, each athlete tries to play one or two moves alternately and where the athlete who has the highest accumulated score will win. Kyorugi is a battle between two taekwondoin where they attack each other and defend themselves while protecting themselves from attacks by using the

kick, rebuttal, and punch techniques that are in taekwondo.

Physical condition is one of the conditions used to achieve performance and to achieve the desired performance in which an athlete must prepare relatively long. Maksum (2012: 22) states that there are ten components of physical condition, and these components are strength, endurance, muscular power, speed, flexibility, agility, coordination, balance, accuracy, and reaction. During the preparation period before the competition, the athlete will actually be nurtured and improved his physical condition, so that the athlete is ready to face the pressures caused in the form of mental and physical stress. Before a match, an athlete must achieve a good level of fitness to deal with the stress that will be encountered in the match.

The development of physical conditions in Taekwondo is very important to improve the athlete's abilities and achievements. A coach must also pay attention to how to create a systematic training program and apply theories of existing

physical conditions, both physical conditions in general or towards the specificity of the sport itself. Exercises undertaken to increase leg muscle power must involve the muscles to be developed, namely leg muscles and in accordance with the energy system used in these activities. The demands for effective and efficient training methods are driven by the facts or symptoms that arise in training. Some reasons for the importance of the need for efficient training methods, according to Lutan (2002: 26), are "(1) Efficiency will save time, energy or costs; and (2) Efficient methods will enable students or athletes to master higher levels of skill."

Based on observations, the leg power was still relatively lacking. This could be seen empirically that the kicks taken in some competitions were still very weak. This showed that the leg power was still low. In the Kyorugi match, athletes who had good kick power will be more profitable in gaining points in the match, therefore a weight training model with an important technical approach is given. Power is the product of strength and speed, so that athletes have good power, in making a kick the results will be relatively strong and fast (Sukadiyanto, 2011: 128). Good practice is not enough by only providing technique, but also improving the quality of power with a technical approach. In the field, there were still many trainers who did not know the form of power training using resistance band weights with a technical approach.

Resistance bands are an efficient and easy-to-carry fitness sports equipment made of rubber with handrails that become the pedestal. Rubber resistance bands have varying elasticity. In this study medium-sized resistance bands can be used to practice increasing power in taekwondo branches. The use of resistance bands weights is very helpful for varied training in increasing athlete performance. This research needs exercises that can significantly help athletes improve leg power. Power training using resistance bands loads with a technical approach using attack kicks and counters is very useful. This training is expected to improve the technical ability of movement and power which is very useful during the Kyorugi number match.

Based on the results of observations made by researchers, at the time of training, the trainer practiced more techniques than physical exercises, but in reality many technical exercises had an impact on the components. The training given means the trainer does not explain the exercise program in written form, so the training program is not well ordered. Creative coaches must have expertise in choosing the right training methods and forms and in

accordance with the needs of athletes (individuals) and approaching the real games. Harsono (2015: 113) argued that "training must be planned and adjusted for each individual so that thus the exercise can produce the best result for the individual." This research focused on 8 weeks of training with resistance bands in specific periods, the training frequency of 8 weeks is more structured and longer training.

Tama (2015) states that resistance band exercises have a significant effect on increasing power. Frank et al. in Ismaryanti (2016) mentioned a combination of resistance band exercises is very effective and useful to increase the height of jumps and leg strength, increase speed, agility. In addition, exercise using resistance bands can also increase joint strength and can be used for aerobic exercise. Based on the above problem, the writer conducted a study entitled "The effect of 8 weeks training with resistance bands in a special period to increase the limb power of taekwondo athletes".

2 RESEARCH METHODS

This type of research was quasi-experimental. Sugiyono (2007: 75) states that the main characteristic of quasi experimental design is the development of true experimental design, which has a control group but cannot function fully to control variables from outside that affect the implementation of the experiment. The design used in this study was control groups pre-test post-test design.

2.1 Population and Research Samples

The populations in this study were 18 athletes in Dojang Tamanan DIY. Sampling in this study was conducted by purposive sampling. Based on these criteria, 10 athletes are met.

2.2 Research Instrument

Test instruments used for the initial measurement (pretest) and final measurement (posttest) was the calament marginal test. The test was done by climbing the stairs amounting to 9 steps that have the same height. To do this, test required three stopwatches, cones, meters, weight scales and assistants. The assistant started the stopwatch when the athlete's foot goes up to the 3rd rung and stoped the stopwatch when the athlete's foot is on the 9th rung. The data for each athlete were obtained using a kalamen power test.

P = Power
M = body weight
D = vertical distance
T = Time
 $P = (M \times D) \times 9.8 \div T$

Data analysis technique

Data analysis techniques used in this study were the normality test, homogeneity test, and t test.

3 RESEARCH RESULTS

The pretest and posttest power of the Taekwondo athlete in the Dojang Tamanan DIY experimental group and the control group are presented in Figure 1 as follows.

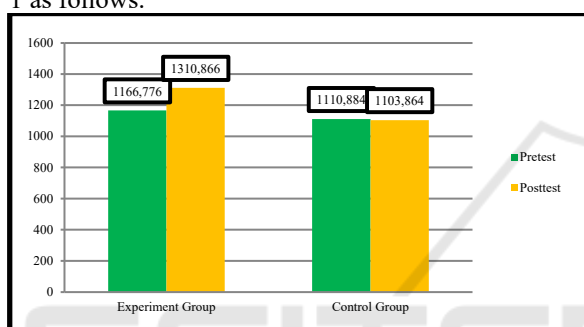


Figure 1. Pretest and Posttest Bar Trunk Power of the Athlete's Experiment and Control Group's Legs

Homogeneity test is useful for testing the similarities of a sample that is uniform or not the sample variant taken from the population. The results are in table 1.

Table 1: Homogeneity Test

Group	Sig.	Information
Pretest	0,523	Homogen
Pottest	0,263	Homogen

From the table above we can see the pretest-posttest sig. $p > 0.05$ so that the data are homogeneous.

The first hypothesis was there is a significant effect of 8 weeks training with resistance bands in special periods on the increase in limb power of taekwondo athletes". Based on the analysis, results were obtained and presented the data in table 2.

Table 2: Pretest and Posttest Test Power of Experimental Group Legs

<i>t-test for Equality of means</i>				
t ht	t tb	Sig.	Difference	%
6,234	776	0,003	144,09	12,35 %

From the results of the t-test it can be seen that t-count 6.234 and t table (df 4) 2.776 with a significance value of p of 0.003. Therefore, t-count $6.234 > t$ table 2.776, and the significance value $0.003 < 0.05$, these results indicate a significant difference. Thus the alternative hypothesis (H_a) which is "there is a significant effect of 8 weeks training with resistance bands in a special period to increase the limb power of taekwondo athletes". Were accepted. From the pretest data it had an average of 1166,776, then at the time of the posttest the average reached 1310,866. The magnitude of the increase in leg power can be seen from the difference in the average value of 144.09 with a percentage increase of 12.35%.

The second hypothesis is "experimental group (8 weeks exercise with resistance bands in a special period) is better than the control group for increasing the limb power of taekwondo athletes." It can be known through the difference in mean between group A and group B. Based on the analysis results, obtained data are presented in the table 3.

Table 3: Experimental Group t-test with Control Group

Average Difference	<i>t-test for Equality of means</i>			
	t ht	t tb	Sig.	Difference
144,09	5,419	2,306	0,001	151,11
7,02				

From the t test table above it can be seen that t arithmetic is 5.419 and t-table (df = 8) = 2.306, while the significance value of p is 0.001. Because t arithmetic $5.419 > t$ table = 2,306 and sig, 0,001 $< 0,05$, there is a significant difference. Thus it showed that the hypothesis (H_a) which is "the experimental group (8-week exercise with resistance bands in a special period) is better than the control group for increasing the limb power of taekwondo athletes", were accepted.

3.1 Discussion

Based on the results of the analysis shows that 8 weeks of training with resistance bands in special periods can increase the power of the legs of taekwondo athletes by 12.35%. With this exercise,

the athlete's initially low leg power ability can be significantly improved.

Resistance band exercise is an exercise modality tool consisting of two straps and a handle that uses its own body weight as a burden. Resistance band suspension training system determines the effects of exercise on physiological metabolic indexes of body performance and intensity. Resistance bands strengthen body muscles, strengthen joint stability, strengthen ligaments, and stabilize a group of muscles. The nature of the spring makes the resistance band helps the process of muscle formation more leverage. When stretching the rope, the muscles of the hands, abdomen, and legs will begin to contract. It increases strength in the bones and muscles, so that the body can be firmer, with increasing muscle strength, the speed is also increasing. This also increases in speed is caused when using movements of resistance bands is done quickly and repeatedly. Resistance training is an exercise program that causes muscles to contract against external loads in hopes of increasing endurance, strength and muscle mass (Mahardika, 2017).

Uchida (2016) found that the elastic band has a different tension force on 8 colors owned by the elastic band. The different durability of each color is measured at 10 elongations whose initial distance is 0.3 meters and the maximum stretch distance is 1.05 meters with the results displayed in kilogram-force (kgf). The results of this study indicated that the greater the level of stretching in the elastic band, the greater the increase in tension force.

Resistance exercise is an important element in rehabilitation programs for someone who has functional disorders and integral components and has the potential to improve motor work ability, and prevent or reduce the risk of illness and injury (Yu et al., 2013). This exercise is active and is carried out 3 times a week for maximum results (Princeton in Magdalena, 2017).

Resistance exercise can also increase flexibility, joint ROM, and stimulate proprioceptive increases because strengthening exercises will increase the activities of motor unit recruits that will activate the tendon of organ tendons and muscle spindles (Brown, 2007). During training the intrafusal and extrafusal fibers will continue to receive sensory input, which will be sent and processed in the brain so that it can determine the amount of muscle co-contraction needed. Some of the responses sent will return to extrafusal and activate golgi tendon so that there will be improvement in coordination of intrafusal fibers and extrafusal fibers with afferent

nerves in the muscle spindle, thus forming a good proprioceptive (Swandari, 2015).

With 8 weeks of treatment time can increase because training provided systematically, progressively, and repeatedly will improve the body's organ systems so that physical appearance will be optimal. The training, which is carried out with a frequency of three times a week, is suitable for beginners and will result in significant improvements. Physical training, which is applied regularly and measured with sufficient amount and time, will cause changes in the ability to produce greater energy and improve physical appearance. Movements made during repetitive exercises will cause the formation of conditional reflexes, learning to move, and the process of memorization of motion (Nala, 2011: 39).

This is because elastic band exercise will improve neuromuscular function and can also cause post-activation potentiation, which is a temporary increase in muscle work that is a result of previous contractions. Improved performance through bridge traffic will result in more cross-bridges being formed until the production of muscle strength increases (Behm et al., 2011 in Magdalena, 2017). Muscle contractions that occur will increase the level of tension (level tension) in the form of an extension of muscle sarcomeres that cause anatomical changes, namely an increase in the number of myofibrils, an increase in the size of myofibrils. Together with an increase in the size of myofibril, the enzyme system that provides energy will also increase. This is especially true for the increase in ATP-PC and enzymes used for glycolysis, which allows the rapid supply of energy during strong and brief muscle contractions and causes biochemical changes in muscles. Biochemical components of muscle have increased, including creatine concentration, creatine phosphate concentration and ATP, and glycogen. Increased energy produced by muscles will have an impact on increasing the ability of muscle contraction which will further increase muscle strength. Muscle strength will help the muscles work optimally to form good stability so that the body can maintain its balance during various movements (Kisner & Colby, 2007).

Resisted exercise using elastic bands can cause isotonic contractions or dynamic muscle contractions where the length of the muscles changes but the muscle tone remains the same. During training, the body will fight the resistance of the elastic band that stimulates so that the joint movement is wider to be able to resist the resistance band. The area of joint motion will cooperate with

the flexibility of the muscles to get optimal ROM results so that the body can determine and direct the movement, especially when the movement requires high balance. Elastic band exercises that involve isotonic contractions can increase flexibility, ROM in the joints due to isotonic contractions in the muscles and proprioceptive stimuli in the joints, muscles and tendons through activation of the golgi tendon and the muscle spindle (Naibaho et al., 2014).

This research focused on 8 weeks of training with resistance bands in specific periods. The training frequency of 8 weeks was more structured and longer training. Tama (2015) stated that resistance band exercises have a significant effect on increasing power. Frank et al. in Ismaryanti (2016), mentioned a combination of resistance band exercises is very effective is used to increase the height of jumps and leg strength, increase speed, agility. In addition, exercise using resistance bands can also increase joint strength and can be used for aerobic exercise.

Resistance band exercises are muscle endurance exercises, simply increasing the potential for muscle energy which causes an increase in overall quality of strength in the muscles while practical exercises with resistance bands improve accurate muscle control and harmonization. The use of tools that have synchronization with this form of exercise will support the formation of varied exercises and have the right load. The use of rubber resistance bands will provide manipulation of motion and interference with altets when doing attacks and counters. Giving a load or disturbance which is located at the waist will provide a load of legs to expend more energy so that the power expended will be more.

The results of the study were strengthened by the research of Soraya, Hariyanto, & Wahyudi (2016). The results of the previous study showed that the flexible rope and lunge dumbbell training models significantly influence the achievement achievement of 25 meter freestyle swimming skills in X-Nursing (KPR) class 03 SMKN 2 Malang when compared to conventional training. Awaludin (2015) added that there was an effect of squat weight training on the power of the Mawashigeri kick in Aceh's Kempo athletes in 2015. This is also supported by Alekhya (2015) who investigated the effect of resistance tube exercise on kicking accuracy, which aimed to find out the increased accuracy of kicks, perpendicular jumps and technical tests 40 yards using a resistance tube exercise.

4 CONCLUSION

Based on the results of data analysis, description, testing of research results, and discussion, conclusions can be drawn, namely there is a significant effect of 8-week training with resistance bands in special periods to increase the power of the taekwondo athlete's legs.

REFERENCES

- Arikunto, S., 2006. *Prosedur penelitian suatu pendekatan praktek*. Jakarta: PT Bina Aksara.
- Brown, L.E., 2007. *Strength training*. US : Human Kitenic 1.
- Harsono. 2015. *Kepelatihan olahraga. (teori dan metodologi)*. Bandung: Remaja Rosdakarya.
- Ismaryati. 2009. *Tes pengukuran olahraga*. Surakarta: UNS.
- Kisner, C., Colby, L.A., 2007. *Therapeutic exercise: foundation and techniques*. 6th Edition. Philadelphia: F.A. Davis Company.
- Lutan, R., 2002. *Belajar ketrampilan motorik. pengantar teori dan metode*. Jakarta: Departemen Pendidikan dan Kebudayaan Direktorat Jenderal Pendidikan Tinggi Proyek Pengembangan Lembaga Pendidikan Tenaga Kependidikan.
- Magdalena, A.I., 2017. *Pengaruh core stability exercise terhadap resiko jatuh pada lanjut usia di panti sosial Tresna Werdha Gau Mabaji Gowa*. Skripsi tidak diterbitkan. Makassar: Fakultas Kedokteran Universitas Hasanuddin.
- Mahardika. 2017. Pengaruh latihan resistance dan plyometrik terhadap kekuatan otot tungkai dan kelincihan pada pemain futsal. *Journal Unipa Surabaya*. Vol. 68 No. 1.
- Maksum, A., 2012. *Metodologi penelitian dalam olahraga*. Surabaya: Unesa University Press.
- Naibaho, B., Wibawa, A., & Indrayani A.W., 2014. *Kombinasi resistance exercise dan stretching lebih meningkatkan keseimbangan statis dibandingkan stretching pada lansia di Desa Blimbing Sari, Kecamatan Melaya, Kabupaten Jembrana, Bali*. Skripsi tidak diterbitkan. Denpasar: Fakultas Kedokteran Universitas Udayana.
- Nala, N., 2011. *Prinsip pelatihan fisik olahraga*. Denpasar: Komite Olahraga Nasional Indonesia Daerah Bali.
- Romadhon. 2017. *Pengaruh latihan menggunakan resistance band terhadap power tungkai atlet*

ukm taekwondo UNY. Skripsi sarjana, tidak diterbitkan. Universitas Negeri Yogyakarta, Yogyakarta.

Sugiyono. 2007. *Metode penelitian kuantitatif, kualitatif, dan R&D*. Bandung: Alfabeta.

Sukadiyanto. 2011. *Pengantar teori dan metodologi melatih fisik*. Bandung: CV Lubuk Agung.

Suryadi, V.Y., 2002. "*Taekwondo poomsae taeguk*". Jakarta: PT Gramedia Pustaka Utama

Swandari, N.M.L., Nurmawan, P.S., Sundari, L.P.R., 2015. *Pelatihan proprioseptif efektif dalam meningkatkan keseimbangan dinamis pada pemain sepak bola dengan functional ankle instability di SSB Pegok*. Denpasar: Universitas Udayana.

