



COMPETITOR:

JURNAL PENDIDIKAN KEPELATIHAN OLAHRAGA

e-ISSN: 2657-0734 & p-ISSN: 2085-5389 || Volume 16, Number 1, 2024, || P.01-07

DOI: 10.26858/cjeko.v16i1.54223

Development of Push-Up Board Aids as an Alternative to Bicep and Tricep Brachii Muscle Training in Karate Sports

Ivona Varella Putri Arismanda^{1A-E*}, Yuyun Aprilia^{2B-D}, Anisa Putri Nastiti^{3B-D}, Manfia Nurkholidah^{4B-D}, Budiman Agung Pratama^{5B-D}, Nur Ahmad Muharram^{6B-D}

^{1,5,6}Fakultas Ilmu Kesehatan dan Sains / Universitas Nusantara PGRI Kediri / Jawa Timur / Indonesia

^{2,3,4}Fakultas Ilmu Keguruan dan Pendidikan / Universitas Nusantara PGRI Kediri / Jawa Timur / Indonesia

arismanda7@gmail.com^{1*}, yuyunap952@gmail.com², anisaputrin18@gmail.com³,
manfianurkholidah@gmail.com⁴, agung10@unpkediri.ac.id⁵, nur.ahmad1998@unpkediri.ac.id⁶

ABSTRACT

In the sport of karate, there are punching movements that focus on the athlete's muscle strength. To get maximum punches, proper muscle training is needed, the muscles used for this punch movement are the biceps and triceps brachii. There is an innovative tool that can be used as an alternative training tool for karateka athletes, namely the push-up board tool which has been developed according to the needs of karate athletes. This research was carried out to find out the feasibility of the push-up board tool to help karate athletes train their biceps and triceps muscles, to find out the practicality of the push-up board tool in karate athletes' push-up training, to find out the effectiveness of the push-up board tool as an alternative push training up board. This research uses the Research and Development research and development method with the Analysis, Design, Development, Implementation, and Evaluation model. The data collection techniques used in this development research are direct observation and data analysis techniques using validity analysis techniques for the products produced and product trial analysis that has been produced in the development research. The results obtained in this research are an average feasibility of 80% based on tests by media experts, media practicality of 85.25%, and 85.5% effectiveness based on trials on respondents.

ARTICLE HISTORY

Received: 2024/11/14

Accepted: 2023/11/30

Published: 2024/02/21

KEYWORDS

Karate Sports;
Biceps;
Triceps;
Push-Ups Board.

AUTHORS' CONTRIBUTION

- Conception and design of the study;
- Acquisition of data;
- Analysis and interpretation of data;
- Manuscript preparation;
- Obtaining funding

Cites this Article : Arismanda, Ivona Varella Putri; Aprilia, Yuyun; Nastiti, Anisa Putri; Nurkholidah, Manfia; Pratama, Budiman Agung; Muharram, Nur Ahmad. (2024). *Development of Push-Up Board Aids as an Alternative to Bicep and Tricep Brachii Muscle Training in Karate Sports*. **Competitor: Jurnal Pendidikan Kepeleatihan Olahraga**. 1(1), pp. 01-07

INTRODUCTION

Karate is a branch of martial arts where the form of movement uses the feet and hands such as punching, parrying, and kicking. Karate was created by ancient masters to defend themselves, not to attack. Karate was brought to Indonesia by students. In every karate match, the technique most often used is the punch technique. This is because attacks using punches have a greater chance of getting points/values compared to using other techniques (kicks). The gyaku tsuki chudan blow is the dominant blow used by a



karate athlete in the committee among other blows such as Oi-Tsuki Chudan, Oi-Tsuki Jodan and Uraken. It requires intensive training stages and processes with various variations of training to help master the gyaku tsuki punching skills well. (Hudain & Ishak, 2020).

When a karateka athlete makes a punch, this condition will affect the movement of the muscles in the arm, namely the biceps and triceps brachii muscles. The biceps muscle is a muscle located in the front of the upper arm. Meanwhile, the triceps brachii muscle is a muscle located on the back of the upper arm. The biceps brachii is located at the front of the upper arm and functions for arm flexion, while the triceps brachii is located at the back of the upper arm and functions for arm extension. In karate, these muscles are important for performing various movements such as punches and kicks, and help strengthen attacks and defense. The biceps brachii is a muscle located on the front of the upper arm, stretching from the shoulder to the elbow. This muscle has two heads, namely the long head and the short head, which work together to perform movements such as flexing the arm. In the context of karate, the biceps brachii plays an important role in the execution of punches and movements that require the use of forearm strength. When a karateka performs an attack with the front hand, such as a straight punch (choku-zuki) or a circular punch (mawashi-zuki), the bicep brachii contracts to produce sufficient force. Training and developing the bicep brachii can increase the power and speed of punches, which are vital aspects of karate. The triceps brachii is a muscle located on the back of the upper arm, stretching from the elbow to the shoulder. This muscle has three heads: the long head, the lateral head, and the medial head. The triceps brachii plays a role in arm extension movements, such as kicking or stopping an opponent's punch. In the context of karate, the triceps brachii helps to strengthen and optimize the blockade (uke) movement as well as kick (geri). When a karateka performs a trailing arm block or a powerful kick, the triceps brachii work intensively to provide the necessary stability and strength. Exercises focused on developing the triceps brachii will help increase the effectiveness and safety of performing these movements. In implementing karate techniques, coordination between the biceps brachii and triceps brachii is very important. For example, when executing a kick, karateka uses the strength of the triceps brachii to produce speed and intensity in the kick, while the biceps brachii helps maintain balance and stability during the movement. Therefore, combining strength and coordination between these upper arm muscles is the key to producing powerful and precise karate movements.

The use of the biceps and triceps brachii muscles during the hitting movement requires special training to maximize this movement. However, from a survey conducted by the author, there were approximately 35% of karateka trainers in Kediri Regency who did not understand the impact of the biceps and triceps brachii muscles when a blow is delivered. If you don't train properly, the damage to the biceps and triceps brachii muscles can result in dangerous injuries for athletes. This danger does not only refer to injuries to the arms but can result in injuries to other parts of the body. Exercises that can be done to maximize the punching movements performed by karate athletes are by doing push-

up exercises. Push-ups are a basic movement that targets the pectoralis major, bicep brachii and tricep brachii muscles, as well as the scapular muscles which act as stabilizers, Fajar & Tegar (2018).

In this research, the author focuses on how to do proper push-up training to maximize punching movements in karateka athletes. To overcome problems for trainers, the author developed a push-up board tool for karateka training. This tool is in the form of a push-up board with a position that can directly train the strength of the biceps and triceps brachii muscles. There are several training positions that athletes can do to achieve biceps and triceps brachii muscle strength.

METHODS

This research refers to the development research method or Research and Development (R&D). In this research using the ADDIE model. The ADDIE (Analysis, Design, Development, Implementation, Evaluation) model is a framework popularly used in research and development (R&D) in the field of education. This model provides a systematic approach to designing, developing, and evaluating effective learning programs. This article will explain in detail the ADDIE model and how this model is used in the context of educational research and development.

The first stage of the ADDIE model is analysis, where the researcher carries out an in-depth evaluation of the needs required by the target, namely karateka coaches and athletes. This analysis includes identifying the target audience, development goals, potential obstacles, and individual characteristics and needs. This analysis process provides a solid foundation for appropriate development. At the analysis stage, researchers analyzed the training needs of karateka athletes to find out the basic problems that occur in the field when karateka athletes train. The analysis carried out is the accuracy of the training carried out to maximize the athlete's stroke. To get the maximum punch, athletes need to do several exercises, especially push-ups to strengthen the arm muscles.

Analysis of trainers was carried out to find out tools that can be used as alternative training and can be used by athletes who prioritize the comfort and safety of athletes. Safety characteristics include the absence or minimizing of the risk of injury to athletes, the accuracy of the size of the tool used, and the impact on the biceps and triceps brachii muscles. Analysis of these trainers needs to be done to make it easier for researchers to develop tools that suit existing needs in the field.

The analysis that the researchers carried out was by observing and interviewing coaches regarding the exercises carried out to strengthen arm muscles so that athletes can maximize the blows they make. From the results of the coach's interview, it was revealed that a push-up aid in the shape of a board and suitable for the use of the biceps and triceps muscles had never been developed.

At the design stage, researchers developed the structure and tools for push-ups based on the results of previous analysis. This includes the selection of materials, type of push-ups, and length of exercise required. This design must consider the safety and

comfort of athletes when doing exercises using the push-up aids that will be developed. This product will be developed with greater emphasis on the use of the biceps and triceps brachii muscles in karate. Things that can be considered in the design developed by the author are: a) the size of the push-up board is 60 cm long, 18 cm wide, 3 cm; b) has a grip or handle made of ABS plastic which is comfortable to use and coated with a soft sponge so that it is safe for continuous practice; c) there are 3 push up positions that can directly train the arm muscles, namely focusing on the biceps and triceps brachii.

The development stage involves the production of tools based on the designs that have been created. The product was developed from a needs survey conducted on trainers at Dojo Smaneka. The product was innovated from an existing push-up board aid and adapted to training needs to strengthen the biceps and triceps brachii muscles in karate athletes. This tool consists of a push-up board and push-up grips. The push-up board was developed with a design that is easy to carry anywhere and can be used anywhere. This tool was designed with safety in mind by ensuring the development of a non-slip tool when used for training by karateka athletes.

The implementation stage in this research was carried out on karate athletes according to the target of the push-up board tool. This push-up board tool will be implemented for karate athletes at the Smaneka Basecamp Dojo located at Jl. Raya Kediri-Blitar No. 71 North Pule, Pule, District. Kandat, Kab. Kediri, East Java. With research subjects 28 karate athletes and 2 trainers at the Smaneka Basecamp Dojo. Before implementing it on athletes and coaches, this research also carried out tests on media experts to find out the feasibility of the push-up board tool that had been developed.

In the research evaluation stage, researchers assessed the effectiveness and efficiency of the push-up board tool that had been developed based on data and responses from tool users during the implementation process. This evaluation includes success in achieving the goals of developing the push-up board tool, and tool safety, as well as evaluations that can make the tool perfect and improve quality in the future.

Quantitative analysis includes the following steps: a) Validity. Validity is obtained through a questionnaire addressed to media expert validators; b) Practicality. Measured through a questionnaire addressed to karate trainers. Practicality is obtained from main product trials. The practicality questionnaire by the trainer and the respondent questionnaire have a scale Guttman; c) Effectiveness. The effectiveness here is to measure the success of the media that is tested during the training process carried out by athletes using push-up boards. Effectiveness data was obtained from the results of respondent questionnaires filled out by athletes after using the Brachii Push-Up Board.

RESULTS AND DISCUSSION

Validation of push up board aids consisting of media expert validation and practicality validation to determine the validity of the push up board aids and determine

the practicality of the product. Data from the expert tests that have been carried out are presented in the following table:

Table 1.

Data from the development of media expert validation tools

No	Rated aspect	The score obtained	Score Maximum	Present %	Category
1	Appropriateness of the content of the material	4	5	80%	Worth it
2	Tool Design	8	10	80%	Worth it

Based on the data from the development of media expert validation tools, a score of 4 was obtained with a maximum score of 5, so a percentage of 80% was obtained in the feasibility aspect of the content of the material in the appropriate category. Meanwhile, in the tool design aspect, a score of 8 was obtained with a maximum score of 10, so a percentage of 80% was obtained, which is an appropriate category. The percentage results obtained are included in the "feasible" category, which can be interpreted as suitable for use, but there are small improvements to the push-up aids that have been innovated.

Meanwhile, the results of the practicality test carried out on trainers show that the push-up board tool, named Bachii Push-Up Board, is practical with the description in the data table of the results of the development of the material expert validation tool. The results of material expert validation are presented in the following table:

Table 2.

Data from the development of material expert (trainer) validation tools

No.	Rated aspect	The score obtained	Score Maximum	Present %	Category
1	Appropriateness of the content of the material	7	8	87,5%	Very worthy
2	Tool Design	10	12	83%	Very worthy

Based on data from the development of material expert validation tools, a score of 7 was obtained with a maximum score of 8, and a percentage of 87.5% was obtained in the feasibility aspect of the material content in the very feasible category. Meanwhile, in the tool design aspect, a score of 10 was obtained with a maximum score of 12, so a percentage of 83% was obtained, categorized as very feasible. It can be interpreted that the Brachii Push Up Board based on the results of media expert tests and practicality tests that have been carried out can influence the training process and the results of punches for karateka athletes. By using the Brachii Push-Up Board, the athlete's arm muscles used for punching movements, namely the biceps and triceps brachii, can be trained optimally and can influence the power of the punch athlete. The main objective of this research is that the Brachii Push Up Board development tool can be used by validity, practicality, and effectiveness. The validity and practicality of the Brachii Push-Up Board can be seen from the results of media expert tests and practicality tests by trainers. One of the goals to be achieved by this research is the creation of an effective push up aid. After being declared valid and practical, the researchers then conducted

trials on the target users of these tools, namely karate athletes. Then, from the trial, a questionnaire was given to determine the athlete's response to the Brachii Push-Up Board. The results of observation on trials that have been carried out on respondents can be seen in the following table:

Table 3.

Results of tool development from respondents

No.	Rated aspect	The score obtained	Score Maximum	Present %	Category
1	Appropriateness of the content of the material	95	112	84%	Very worthy
2	Tool Design	147	168	87%	Very worthy

Based on the data from the trial results presented in the table above, it can be seen that the score obtained in the feasibility aspect of the material content is 95 with a maximum score of 112, so the percentage is 84% in the very feasible category. Meanwhile, in the tool design aspect, a score of 147 was obtained with a maximum score of 168, so a percentage of 87% was obtained in the very feasible category. It can be concluded based on the data presented in the table that the Push Up Board tool called the Brachii Push Up Board is practically used as an alternative training by athletes which can help the process of training the arm muscles of karate athletes, namely the biceps and triceps brachii so that they can perform punching movements with maximum power. Brachii Push-Up Board has a design that has been innovated from existing push-up boards to suit your needs.

Karate athletes train their arm muscles so that this push-up board can attract athletes to be enthusiastic about practicing push-ups. In this development, user safety is prioritized and from the test results, it can be confirmed that this push-up board aid is safe to use and can minimize the risk of injury when karateka athletes are doing push-up training. The Brachii Push-up Board is very easy to use and is also an alternative tool for push-up training that can be taken anywhere with a foldable board design that can be used many times.

CONCLUSION

Based on the development and trials carried out in the field on the push-up board tool, the development from the validity aspect shows that this teaching material is valid and can be used with a percentage of 80%. Meanwhile, the practical aspect shows that the teaching materials are practical and can be used as seen from the results of the practicality questionnaire by karate athlete trainers with a percentage of 85.25%. The effectiveness results seen from the respondent questionnaire filled out by karate athletes show that the development of the push-up board or Brachii Push Up Board has been declared effective and can be used as an alternative arm muscle training for the biceps and triceps brachii of karate athletes with a percentage of 85.5%.

REFERENCES

- Ade Mulyono, R. F. (2021). Perbedaan Pengaruh Latihan Handstand Push-Up Dan Floor Push-Up Terhadap Daya Tahan Otot Lengan Atlet Gulat Putra Jawa Tengah Tahun 2020. *JURNAL ILMIAH PENJAS*.
- American, C. o. (2017). ACE Personal Trainer Manual: The Ultimate Resource for Fitness Professionals. *American Council on Exercise*.
- Baechle, T. R. (2008). *Essentials of strength training and conditioning (3rd ed.)*. Human Kinetics.
- Bete, D. E. (2020). Pengaruh Latihan Push-Up Terhadap Peningkatan Kekuatan Otot Lengan pada Siswa Ekstrakurikuler Bola Voli di SMPK Nurobo. *Ciencias: Jurnal Penelitian dan Pengembangan Pendidikan*, 93-101.
- Branch, R. M. (2014). *Instructional Design: The ADDIE Approach*. Springer.
- Fleck, S. J. (2014). *Designing Resistance Training Programs (4th ed.)*. Human Kinetics.
- Gentil, P. &. (2013). Influence of supervision ratio on muscle adaptations to resistance training in nontrained subjects. *The Journal of Strength & Conditioning Research*, 27(11), 3043-3048.
- Haviz, M. (2016). Research And Development; Penelitian Di Bidang Kependidikan Yang Bermakna. *Jurnal Ilmiah Ta'dib*.
- Miyagi, M. F. (2011). *Muscle architecture and strength of the knee flexors and extensors during concentric*.
- Morrison, G. R. (t.thn.). *Designing Effective Instruction*. John Wiley & Sons.
- Purba, P. H. (2016). Upaya Meningkatkan Kecepatan Pukulan Gyaku Tsuki Chudan Melalui Bentuk Latihan Variation Of Body Drops Pada Siswa Putra Ekstrakurikuler Karate Sma Swasta Kristen Immanuel Medan Tahun 2016. *Wahana Didaktika : Jurnal Ilmu Kependidikan*.
- PUTRI, K. E. (2020). Pengaruh Latihan Push-Up Terhadap Kecepatan Pukulan Kisame Tsuki Pada Atlet Karate Makassar. *eprints*, 1-28.
- R.A. Reiser, D. J. (2017). *Trends and Issues in Instructional Design and Technology*. Pearson.
- Schoenfeld, B. J. (2017). Evidence-based guidelines for resistance training volume to maximize muscle hypertrophy. *Strength & Conditioning Journal*, 41(4), 66-73.
- Smith, P. L. (2019). *Instructional Design*. John Wiley & Sons.
- Sugiyono. (2013). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, Dan R&D*.
- Sugiyono. (2018). *Metode Penelitian Kuantitatif*. Bandung: Alfabeta.
- W. Dick, C. L. (2014). *The Systematic Design of Instruction*. Pearson.
- Wackerhage, H. &. (2006). How nutrition and exercise maintain the human musculoskeletal mass. *The Journal of Physiology*, 554(3), 595-606.