ISSN : 2087-927X (print)
ISSN : 2685-0516 (online)
Altius: Jurnal Ilmu Olahraga dan Kesehatan
Volume 12, No. 2, November 2023, p.361-372
http://dx.doi.org/10.36706/altius.v12i2.22612

Development of a model of reaction speed training tools for sitting volleyball athletes NPCI Lahat district

Muslimin[1,] *, Mohd. Yoga Saputra[2,] Aprizal Fikri[3] , Apita Mareli[4]
[1,2,3] Sport Education, Faculty of Social and Humanities, Universitas Bina Darma, Palembang, Indonesia
[4] Phyisical Education Postgraduate Program Universitas Bina Darma
muslimin@binadarma.ac.id[1], mohdyogasaputra05@gmail.com[2] ,aprizal.fikri10@binadarma.ac.id[3] , mareli.apita88@gmail.com[4]
*corresponding author

ABSTRACT

This study aimed to develop a model of a reaction speed training tool for NPCI Sitting Volleyball athletes in the Lahat Regency. This type of development research uses the Research & Development development model approach developed by Borg & Gall. The research subjects were 24 male and female sitting volleyball athletes at NPCI Lahat Regency. The data collection instrument uses a questionnaire, observation, and skill test model training tools. Data analysis techniques use the percentage %. The results of the study were based on validation experts who were assessed by two experts, namely volleyball learning experts and coach practitioner experts. The results of the small group trial were carried out on sitting volleyball athletes from NPCI in Lahat Regency with a total of 12 athletes and 24 athletes large-scale. The results of the small-scale trial with a percentage Score of 91% valid with revisions and the large-scale trial obtained a percentage score of 93% valid without revisions which is in the good/decent category. Thus, it can be concluded that the development of a reaction speed training pool model for sitting volleyball athletes at NPCI Lahat Regency can be used to increase the reaction speed of sitting volleyball athletes. The novelty of this development model is that it uses media tools and is supported by an arrangement of training models which are of course the characteristics of sitting volleyball athletes without losing the aim of reaction speed training.

Keywords: *tool development, exercise model, reaction speed, sitting volleyball*

ARTICLE INFO

Article History:
Accepted : 23th September 2023
Approved : 29h November 2023
Available Online November 2023

Correspondence Address:
Muslimin
Sport Education, Universitas Bina Darma
Sreet Jend. A. Yani Plaju Palembang
E-mail: muslimin@binadarma.ac.id

INTRODUCTION

The role of sport is very important in the lives of people with disabilities, people who are born into the world with disabilities tend to experience many obstacles in various areas of life, which means that there are many physical imperfections in certain people. The factor that causes people with disabilities to potentially experience obstacles to self-actualization is self-confidence. The results of research conducted by (Okan Miçooğullari & Kirazci, 2016) on Turkish students found that self-confidence, which is part of mental toughness, remains consistently used as one of the basic needs for sports training with assumptions and continues to show the potential importance of Sport Mental Toughness (SMT). In a physical education learning environment, sport represents a person's ability to meet the needs of practice and competition, increasing determination, focus, self-confidence, and maintaining control under

pressure.

The development of training for athletes specifically with disabilities is also currently increasingly developing. Because disability sports have an impact on improving a person's performance. Various disability sports are contested, one of which is Sitting Volleyball. This sport requires special training according to the characteristics of the game, as research results from (Borges et al., 2023) special training for disabled athletes or sports players is adapted to the characteristics of their type of disability so as to produce effective training. (Zerger, 2008) A study of movement in sitting-volleybal. (De Castro et al., 2020) Examining the relationship between cortisol, creatine kinase (CK), estradiol, pain perception, low back pain and low back pain. Functional disability, and abdominal and lumbar muscle strength in postmenopausal women with low back painful. As a result, sports that use the upper body must have strength in the waist and abdominal muscles, such as volleyball.

The lack of training equipment and the condition of athletes - athletes with disabilities find it very difficult to start training compared to normal athletes. Therefore, reaction speed training is very important to help improve the ability to carry out sports activities to increase achievements. According to (Harsono, 2015) Ron speed is the quality that allows starting a kinetic answer as quickly as possible after receiving a stimulus. Currently, the development of technology in the world is very rapid, the development and technology of sports is needed for the advancement of sports achievements of people with disabilities.

The development of science and technology currently emphasizes the interests of educational programs that move in all professional fields of science and include sports coaching. With the development of technology at this time the author wants to develop a tool that is designed in such a way with the basis of sports science to help the coach provide training programs for athletes, especially the Sitting Volleyball sports. Sitting volleyball is a sport that apart from having sporting advantages, also has an integrative nature. The level of physical activity and the incidence of injuries and overtraining syndrome in the best disabled volleyball players in Poland playing sitting volleyball were tested using a questionnaire. Significant engagement in physical activity through various additional forms, not just volleyball, has been noted (Wieczorek et al., 2007).

Statistical Match Analysis (SMA) is used to present the team's performance in scoring skills: attacks, blocks, serves and opponents' errors. The results of this research will allow players, coaches, officials, and others interested in sitting volleyball to take a closer look at

sports activities specifically for people with disabilities (Vute, 1999). Research from (Jeoung, 2017) to determine the relationship between sitting volleyball performance and court fitness of sitting volleyball players. Our results show that chest passing, overhand throwing, one-handed throwing, one-handed side throwing, speed endurance, reaction time, and graded training test results have a statistically significant influence on volleyball performance. This study has been to show that through special training, disabled players practicing sitting volleyball, how much they manage to improve their own performance, approaches the standards of non-disabled players. The results of the research in the sitting volleyball game achieved an inclusive model of sports participation and assessment of sports skills. In this way, it will also be developed in other team sports to declare full inclusion of disabled and non-disabled people in competitive sports (D'isanto, 2020).

Sitting Volleyball athletes need special training so they can develop both technical and physical skills. This special assistance is based on research results from (Deddy Whinata Kardiyanto, 2020) that based on the athlete's perspective, this assistance is also considered successful because it provides athletes with full awareness of the basics of the training program so that they can carry out the training independently and feel the benefits of the training that has been prepared by them. trainer and collaborator.

Another factor that can influence technical performance is physical condition. Seated Volleyball athletes who have weak physical conditions will of course find it difficult to develop good technical skills, because in the Seated Volleyball game almost all movements are supported using the athlete's two arms. The athlete moves in a dominant direction using the arms. Therefore, when the athlete's reaction is slow because both arms are not strong and move quickly, the athlete will have difficulty passing, smashing or blocking because all these techniques use the arms. Therefore, the arms need to be trained to move quickly and be strong enough to support the upper limbs. As the results of previous research conducted by (Suarsana & Baan, 2013) that one method of arm strength training is by giving push up exercises. Furthermore, arm muscle strength contributes greatly to the success of a volleyball smash (Supriyanto & Martiani, 2019). Crawling exercises using both arms can increase arm muscle strength (Liani, 2020). Furthermore, according to (Awang Roni Effendi, 2020) that there is a relationship between arm strength to move and arm length on the success of a volleyball serve.

Based on several research results, because in the Sitting Boa Volleyball game, the athlete's movements are supported by both arms to move, so it is necessary to do reflex speed exercises to train arm strength as well as the athlete's reaction. The specifications of the

products developed in this study are in the form of a model of reaction speed training aids used for training and increasing reaction speed in sitting volleyball athletes NPCI Lahat Regency and special preparation for trainers directly. This product is expected to be a learning resource for athletes undergoing training. Assumptions of research and development of tools This speed is very influential on the reaction speed of Sitting Volleyball athletes. This research follows the flow of research and the development of tools can be a reference for coaches to improve athlete performance and increase knowledge.

METHODS

Based on the problems discussed earlier, the method used is the development research method, or in English terms Research and Development is a research method used to produce certain products and test the effectiveness of these products. According to (Sugiyono, 2016) the Research and Development method is a research method that produces a product in a particular field of expertise. Measuring instruments in research are usually called research instruments (Sugiyono, 2016) which are followed by certain by-products and have the effectiveness of a product.

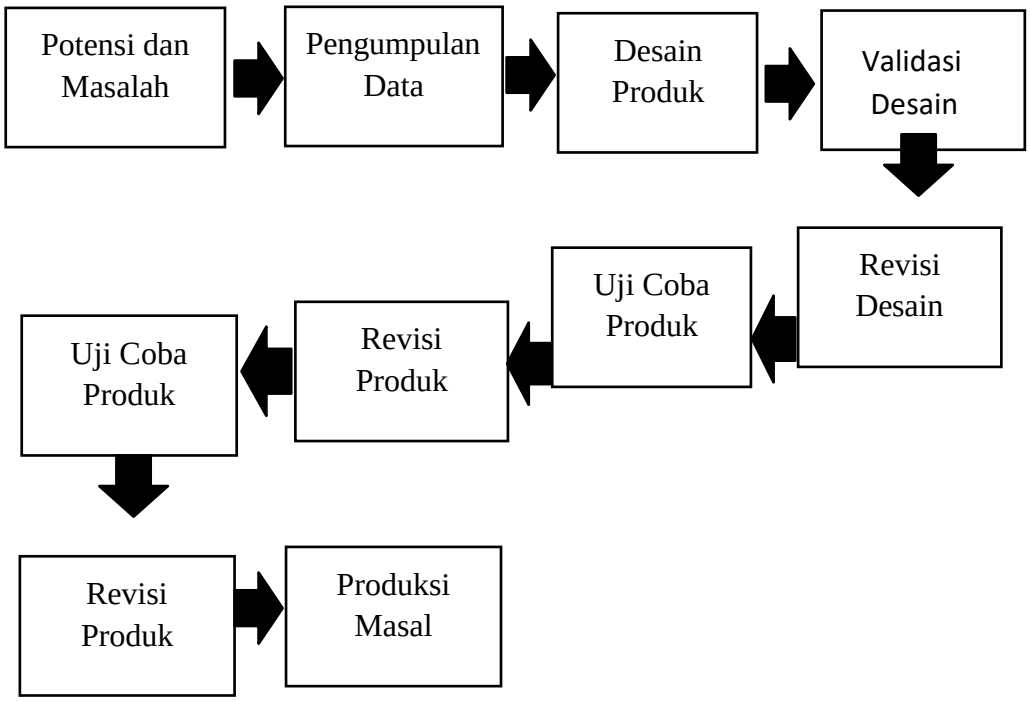


Figure1. Steps R&D (Sugiyono, 2017)

Research Subject

The subjects tested in this study were 24 athletes sitting volleyball NPCI District. Lahat.

Data analysis technique

This data collection technique uses a needs analysis questionnaire, validation questionnaire, athlete response questionnaire, and documentation tools. Qualitative descriptive analysis is the result of interviews, observations and input from experts. The data presented is in the form of criticism, suggestions and responses as input in revising the products we are developing. The results of product assessments carried out by experts and athletes will be processed using quantitative descriptive analysis. The assessment takes the form of a validation questionnaire and an athlete response questionnaire containing questions about the product being developed. The data presented is in the form of numbers/numerics obtained from expert validation questionnaires measured using a Likert scale. The Likert scale is used to measure the opinions and perceptions of people or groups. Data obtained from athlete response questionnaires used the Guttman scale. The Guttman scale consists of two categories which are made in multiple choice form and in checklist form.

Table 1. Likert Scale Assessment

No	Keterangan	Skor
1	Totally agree/always/very much positive	5
2	Agree/often/positive	4
3	Doubtful/sometimes-sometimes/neutral	3
4	Disagree/hardly agree ever/negative	2
5	Strongly disagree/disagree Once	1

(Sugiyono, 2016)

Formula: $F = \frac{x}{n} \times 100\ \%$

Infromation:

F = Score Persentation

X= Jnumber of answers given by the validator

n= Maximum number of scores

The percentage results obtained will be classified to obtain data conclusions. In table 2 the percentage classification will be presented.

Table 2. Classification percentage classification

Persentase Persentase	Category	Meaning
0-20%	Very Less	Thrown away
20,1-40%	Not enough	Fixed
40,1-60%	Enough	Used (conditional)
70,1-90%	Good	Used
90,1-100%	Very good	Used

RESULTS AND DISCUSSION

Result

1. Needs analysis

Based on the results of the needs analysis, observation data from the 24 subjects taken showed that 92% of the subjects agreed that this reaction speed training model was developed. These results show that it is important to develop this training model to support the training process of volleyball players specifically for athletes with disabilities.

2. Design Product

The next stage in this research is to design a product in the form of "Development of a Reaction Speed Training Equipment Model for Sitting Volleyball Athletes NPCI District. Lahat, the development of this tool model was made usingseveral kinds of tools such as iron, lights, cables, and switches. Here's the explanation:

1). Iron/Pole

The poles use an iron pipe model with a thickness of 3mm and are 1 meter long each with an iron seat/plate underneath. This iron functions as a pole/post holding the lights.

2). Lights

The lights used are 4 colors, namely red, yellow, green and white. This light functions to signal reactions

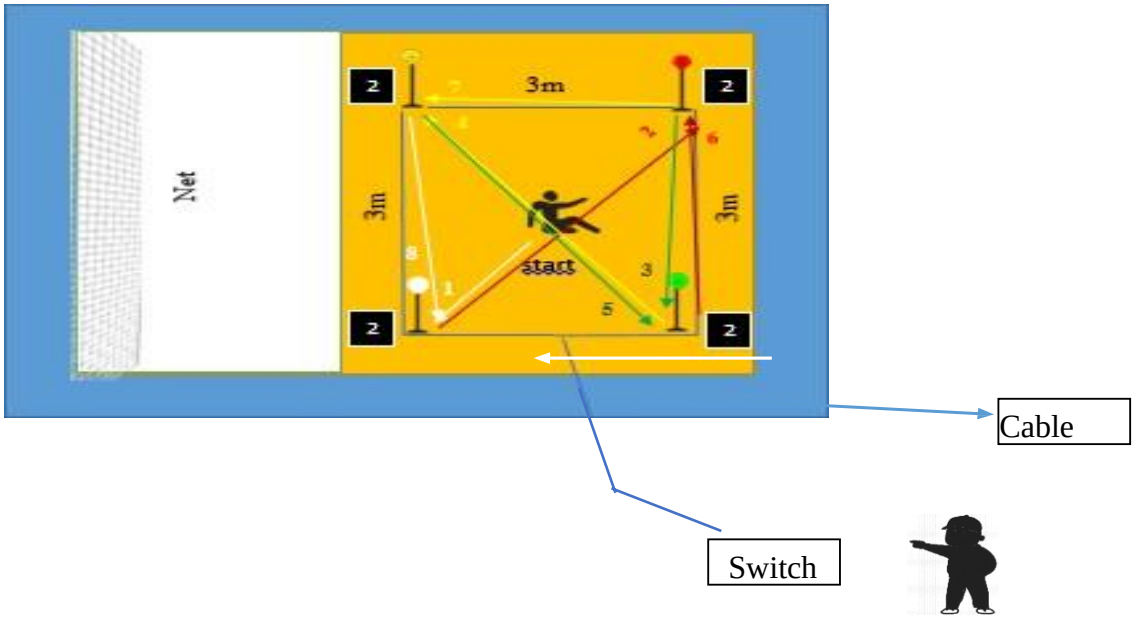
to athletes.

3). Cable

The function of the cable is to transmit electric current to the lamp, with different lengths on each of the 4 sides, namely 1.60 meters to 6.60 meters long.

4). Switch

The switch uses a 4 head switch with 1 button each on each light. The switch functions as an electrical



component that is used to control the flow of electricity to the lamp.

Figure 2. Design Models

3. Exspert Validtion

The following presents the data obtained as a result of the research conducted. The product developed is named "Development of a model of reaction speed training tools for sitting volleyball athletes NPCI Lahat Regency". This product was developed to provide athletes with a new atmosphere in running a reaction speed training program, increase enthusiasm, increase motivation, technological insights for athletes and coaches. The product was validated by 2 expert validators, namely volleyball learning expert Dr. Bangkit Seandi Tarore, lecturer at Bina Darma University Palembang, and coach practitioner Ali Supratman, M.Pd., SON volleyball coach.

Initial results regarding the product development model of training tools for the reaction speed of sitting volleyball athletes show that the product developed is 84% which is in the good/appropriate category, which means that the development of a model of training tools for the reaction speed of sitting volleyball athletes can be tested to the next stage. Initial results regarding the product development of a model of training equipment for the reaction speed of sitting volleyball athletes show that the product developed is 93% which is in the very good/feasible category, which means that the development of a model of training equipment for the reaction speed of sitting volleyball athletes can be tested to the next

stage.

4. Small Scale Trial Results

The questionnaire results from small-scale trials regarding the development of a model of athlete reaction speed training tools for this sitting volleyball NPCI District. Lahat is 91% which is in the very good category.

5. Large-Scale Trial Results

The questionnaire results from the large-scale trial regarding the development of a model of athlete reaction speed training tools for this sitting volleyball NPCI District. Lahat is 93% which is included in the very good category.

After the product has been validated by experts and improvements have been made based on suggestions from experts the product is declared suitable for testing. Small-scale trials were carried out on 12 athletes sitting volleyball NPCI District. Lahat, then the product was reassessed by experts and made improvements, input - input and suggestions from experts. In the next stage, a large-scale trial was carried out again on 24 athletes sitting volleyball NPCI District. Lahat. The development of a speed reaction tool model for sitting volleyball athletes NPCI District. Lahat is declared feasible to use as the development of a speed reaction tool model and as a final product the researcher makes an exercise model as a guideline for implementing training for athletes.

Based on the results of the product trial, the data generated shows that the trial results are in the very good category. It can be seen from the results of the small-scale trial getting a percentage value of 91% valid without revision and the large-scale trial getting a percentage value of 93% valid without revision. These results refer to the predetermined assessment guidelines. The eligibility categories used in this study are divided into several parts, namely, values < 40% are categorized as not good / not feasible, 41% - 55% are categorized as less good / less feasible, 56% - 75% are categorized as quite good / quite feasible, and 76 -100% are categorized as good/feasible.

Discussion

Based on observations in every training process carried out by Sitting Volleyball athletes at NPC Lahat Regency, it is necessary to develop a model of training aids to support and increase the reaction speed of athletes. During the implementation of reaction speed training, the coach only uses the drill training method with the ball, has little training time, and lacks of tools to do reaction speed training. Therefore, the researcher wishes to develop a reaction speed training aid for sitting volleyball athletes at NPCI Lahat. At the data collection stage, the researcher analyzes the development of a reaction speed training tool model and from the results of this analysis, the researcher has the initiative to develop a model of reaction speed training tools for Sitting Volleyball athletes NPCI Lahat to become a training method that motivates sitting volleyball athletes to be more enthusiastic and reduce boredom due to

monotonous training methods when running an exercise program.

Research into the development of training models using media has an impact on improving athletes' skills and physical condition. Because apart from being a media tool to make training easier, this media tool can also increase athletes' motivation to be enthusiastic about training because it uses innovative training methods. As research results from (Muslimin et al., 2020) with research results that the development of digital-based training models can improve volleyball players' serving results. Research results (Destriana et al., 2022) volleyball game passing test design and validationd. Development of measuring instruments and can also be used for passing practice. Training media using technology is also very good for being able to see whether athletes are training optimally or not. Because this media can also be used for direct evaluation for coaches to see the amount of training athletes do because it is digital based. Like the results of research into developing tools to measure volleyball skills, digital media is also a training tool for volleyball games.

The beginning of product development is made into a product in the form of developing a model of speed reaction training tools for sitting volleyball athletes NPCI Lahat. The development of a model of speed training tools for sitting volleyball athletes NPCI Lahat can be used as a reference or guideline for speed reaction training, especially in the field of sitting volleyball that can be applied. This product development process has gone through research, development procedures, some planning, design, and evaluation. After the product is produced, it needs to be evaluated by experts through validation and needs to be tested on athletes. Evaluation is carried out on volleyball learning experts and coach practitioners. Based on input from expert practitioners, the coach reduced the distance between the pole lights from 4 meters to 3 meters.

After obtaining approval from the experts, the next stage of research with small-scale trials and then the implementation of how the product works is made in the form of a video. Based on the results of the small-scale trial, it got a percentage value of 91% valid without revision. The results of the assessment of the product development model of the speed reaction tool for sitting volleyball athletes NPCI District. Lahat from volleyball learning experts and coach practitioners in the questionnaire sheet, that overall it is very good and there is no input from volleyball learning experts. At the large-scale trial stage regarding the development of a model of speed reaction training tools for sitting volleyball athletes NPCI District. Lahat gets a percentage value of 93% which is in the very good/feasible category, which means that the development of a model of speed reaction training tools for sitting volleyball athletes NPCI

District. Lahat can be tested to the next stage.

The results of the assessment of the product development model of the speed reaction tool for sitting volleyball athletes NPCI District. Lahat from volleyball learning experts and coach practitioners in the questionnaire sheet, that overall it is very good and there is no input from volleyball learning experts. Based on the results of the small-scale trial conducted, data can be generated that shows a percentage value of 91% in the category of very good valid without revision and the large-scale trial conducted gets a percentage value of 93% in the category of very good valid without revision. This conclusion is strengthened by the results of several previous studies that the reaction speed training model influences athletes' volleyball playing skills, such as research from (RIZA, 2015) there is a relationship between reaction speed and arm muscle strength on the passing ability of students at Junior High school No 3 Satu Gebog volleyball. Jepara. Furthermore, there is a relationship between reaction speed and hand eye coordination on volleyball smash skills (Anum Nasriani, 2019). There is an influence of Android-based training on the reaction speed of volleyball players (Suhairi & Arifin, 2022). These results refer to the predetermined assessment guidelines, so it can be concluded that the results of the research on the development of a speed

reaction training tool model for sitting volleyball athletes NPCI District. Lahat is "Worthy".

CONCLUSIONS

The development of a speed reaction training tool model for sitting volleyball athletes at NPCI Lahat Regency which was developed is feasible and in accordance with the characteristics of sitting volleyball athletes. The results of this product were declared feasible by conducting a small-scale trial on 12 sitting volleyball athletes to obtain percentage data results so that it could be concluded as valid without revision. The results of large-scale trials with a total of 24 sitting volleyball athletes concluded that the level of vaidation was high and without revision, so it can be stated that the tool developed in the form of a reaction speed training model can be used to train movement reactions in sitting volleyball athletes at NPCI Lahat Regency.

References

Anum Nasriani, R. M. (2019). Kecepatan Reaksi Dan Koordinasi Mata-Tangan Berhubungan dengan Kemampuan Smash Bolavoli. *Program Studi Pendidikan KepelatihanOlahraga, FakultasIlmuKeolahragaan, Universitas Negeri Padang*, 876–888.

Awang Roni Effendi. (2020). Ubungan Latihan Kekuatan Otot Lengan Dan Panjang Lengan Terhadap Kemampuan Service Atas Permainan Bola Voli. *Jurnal Pendidikan Olahraga*,

4(1), 44–55.

Borges, E., Mezêncio, B., Pinho, J. P., & Serrão, J. (2023). Effects of an acute resistance training session on pain and functional disability in people with chronic low back pain: a double blind controlled randomized trial. *Journal of Physical Education and Sport*, *23*(3), 691–696. https://doi.org/10.7752/jpes.2023.03085

D'isanto, T. (2020). Sports skills in sitting volleyball between disabled and non-disabled people. *Journal of Physical Education and Sport*, *20*(3), 1408–1414. https://doi.org/10.7752/jpes.2020.03194

De Castro, J. B. P., Lima, V. P., Dos Santos, A. O. B., Da Silva, G. C. P. S. M., De Oliveira, J. G. M., Da Silva, J. N. L., & Vale, R. G. D. S. (2020). Correlation analysis between biochemical markers, pain perception, low back functional disability, and muscle strength in postmenopausal women with low back pain. *Journal of Physical Education and Sport*, *20*(1), 24–30. https://doi.org/10.7752/jpes.2020.01003

Deddy Whinata Kardiyanto, P. D. A. (2020). Pendampingan Latihan Kondisi Fisik Atlet Bolavoli Duduk National Paralympic Committee(Npc) Indonesia. *Jurnal Program Studi Pendidikan Jasmani Dan Kesehatan*, *8*(03), 104–116.

Destriana, Destriani, & Victorian, A. R. (2022). Volleyball Game Passing Test Design and Validation. *International Journal of Human Movement and Sports Sciences*, *10*(3), 453–461. https://doi.org/10.13189/saj.2022.100312

Harsono. (2015). Periodesasi Program Pelatihan. In P. Latifah (Ed.), *Bandung: PT Remaja Rosdakarya*. PT. Remaja Rosdakarya.

Jeoung, B. (2017). Relationship between sitting volleyball performance and field fitness of sitting volleyball players in Korea. *Journal of Exercise Rehabilitation*, *13*(6), 647–652. https://doi.org/10.12965/jer.1735170.585

Liani, I. (2020). *Pengaruh Latihan Merangkak Terhadap Peningkatan Kekuatan Otot Lengan Atlet Yunior Bola Voli Yuso Yogyakarta the Effect of Crawling Exercise Towards the Improvement of Arm Muscle Strength of Volley Ball Junior Athlete of Yuso Yogyakarta*.

Muslimin, Asmawi, M., Samsudin, Dlish, F., Tangkudung, J., Fikri, A., & Destriana. (2020). Model development of digital based volleyball under service skills instruments. *International Journal of Human Movement and Sports Sciences*, *8*(6), 42–46. https://doi.org/10.13189/saj.2020.080707

Okan Miçooğullari, B., & Kirazci, S. (2016). Effects of 6 Weeks Psychological Skill Training on Team Cohesion, Self-confidence & Anxiety: A Case of Youth Basketball Players. *Universal Journal of Educational Research*, *4*(12), 2761–2768. https://doi.org/10.13189/ujer.2016.041210

RIZA, M. B. (2015). Kekuatan Otot Lengan Dengan Kemampuan Passing Atas Dalam Permainan Bola Voli Siswa Kelas Ix A Skripsi. *Universitas Nusantara PGRI Kediri*.

Suarsana, I. M., & Baan, A. B. (2013). Pengaruh Latihan Kekuatan Otot Lengan Terhadap Ketepatan Smash Dalam Permainan Bola Voli Club Sigma Palu. *Tadulako Journal Sport Sciences And Physical Education*.

Sugiyono. (2016). *Statistika Untuk Penelitian*. Alfabeta.

Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Suhairi, M., & Arifin, Z. (2022). Pengembangan alat drill smash bola voli berbasis reaksi menggunakan android. *Multilateral : Jurnal Pendidikan Jasmani Dan Olahraga*, *21*(1), 71. https://doi.org/10.20527/multilateral.v21i1.12418

Supriyanto, S., & Martiani, M. (2019). Kontribusi Kekuatan Otot Lengan terhadap Keterampilan Smash dalam Permainan Bola Voli. *Gelanggang Olahraga: Jurnal Pendidikan Jasmani Dan Olahraga (JPJO)*, *3*(1), 74–80. https://doi.org/10.31539/jpjo.v3i1.829

Vute, R. (1999). Scoring Skills Performances Of The Top International Men.S Sitting Volleyball Teams. *Acta Universitatis Palackianae Olomucensis*, *29*(2), 55–62.

Wieczorek, J., Wieczorek, A., Jadczak, Å., Åšliwowski, R., & Pietrzak, M. (2007). Physical Activity and Injuries and Overstraining Syndromes in Sitting Volleyball Players. *Studies in Physical Culture & Tourism*, *14*, 299–305.

Zerger, M. (2008). *UNIVERSITY OF CENTRAL OKLAHOMA Edmond, Oklahoma Jackson College of Graduate Studies A STUDY OF MOVEMENT IN SITTING-VOLLEYBALL*.