



The Development of Two Pommels Mushroom Apparatus for Male Artistic Gymnastic Athlete

Agus Darmawan^{1✉}, Tommy Soenyoto², Said Junaidi³, Dwi Gansar Santi Wijayanti⁴

Physical Education Department, Sport Science Faculty, Indonesia¹²⁴
Sport Science Department, Sport Science Faculty, Indonesia³

History Article

Received 31 October 2020
Approved November 2020
Published November 2020

Keywords

Development; Mushroom Apparatus; Artistic Gymnastic

Abstract

The purpose of this study was to determine whether two pommels mushroom apparatus can be used as a training apparatus for athletes in overcoming the difficulties of handling the circling movement of the pommels apparatus. The research method used research and development steps with a sample of 16 athletes, involving 2 gymnastics experts and 2 equipment experts. The result of this research is to get prototype product of mushroom apparatus with two pommels. Gymnastics experts stated that 90% of pommels mushroom apparatus can be used as a training apparatus, equipment experts stated that mushroom apparatus are safe to use for athlete training, and as many as 16 athletes stated that mushroom apparatus can be used for circling exercises. The conclusion of two pommels mushroom apparatus is effectively used by athletes to overcome the difficulties of circling training in pommels apparatus as well as overcoming the limitations of gymnastic facilities in Central Java.

How to Cite

Darmawan, A., Soenyoto, T., Junaidi, S., Wijayanti, D. G. S., (2020). The Development of Two Pommels Mushroom Apparatus for Male Artistic Gymnastic Athlete. *Journal of Physical Education, Health and Sport*, 7 (2), 60-64.

© 2020 Universitas Negeri Semarang

✉ Correspondence Author:
E-mail: agus.putri12@mail.unnes.ac.id

INTRODUCTION

Gymnastics is a sport in which there are competition disciplines including male artistic discipline, female artistic discipline, rhythmic, aerobic gymnastics, and trampoline. (Nassar, 2017). In male artistic gymnastics there are 8 competition numbers, among others; team numbers, all-around, floor, saddle horse, rings, jumping table, parallel bars, and single bars (Code of Point, 2017). The pommels apparatus becomes 1 of 6 apparatus that have a relatively high level of difficulty in handling the motion to meet the mandatory requirements (Baudry et al., 2009). Athletes who display a series of motion on pommels apparatus are expected to have clipping, circling, travel and dismount skills. Circular movement is the main component in the series of motion in the pommels apparatus (Fujihara & Gervais, 2012a), (Fujihara et al., 2009).

Ideally, the circling movement in a pommels should display a continuous circling movement and be displayed with high aesthetics (Baudry et al., 2006). The exercises should be started from simple basic movements until to complex movements (Culjak et al., 2014) as well as training by athletes continuously can improve the quality of athlete's motion (Hsieh, S., et al., 2017). However, the reality that occurs on the field, athletes have difficulty in carrying out a series of movements in the pommels apparatus. This is based on a preliminary study conducted on male artistic gymnastics athletes in Central Java by looking at the results of Province Sport Games 2018, the mastery of all mandatory requirements is a pommels, only 40% of athletes have mastered it. This data shows that the overall mastery of athletes on the pommels is still in the low category.

The development of training apparatus and methods is a solution in overcoming problems in the field. Based on previous research, the development of mushroom apparatus in male artistic gymnastics can be used to increase the effectiveness of circling movements (Soenyoto T., 2014). The results of other studies also state that circulating exercises using mushrooms using a bucket aid can also improve the athlete's circulatory ability (Fujihara & Gervais, 2012b). The results of other studies suggest that exercise using mushrooms can increase the amplitude of the circle movement (Baudry et al., 2009).

Based on the findings of the problem and referring to previous research, the formulation of the problem in this study is how to develop of two pommels mushroom apparatus that can be used

as a means of training for athletes in a pommels mushroom apparatus.

METHOD

This research is a research and development conducted with the aim of producing a mushroom apparatus with two pommels. The steps taken follow the Borg and Gall procedure in Soegiyono (2008: 9) which aims to create or validate new products. The stages of research implementation are as follows; (1) potential and problems, (2) data collection, (3) product design, (4) design validity, (5) design revision, (6) product testing, (7) product revision, (8) usage trial, (9) product revision, (10) final product.

The research subjects involved in the study were 16 athletes of artistic gymnastics, 5 coach, 2 gymnastics experts, 2 supporting gymnastics experts, and 2 equipment experts / experts.

The data collection instrument used interviews which were supported by interview guidelines, observation along with observation guidelines and field notes, documentation as well as documentation guidelines, and assessment rubrics for athletes in carrying out circling movements on the results of developing tools to be carried out in accordance with **Table 1**.

Table 1. Data Collection Instruments for the Implementation of Circular Movements in Gymnastics Athletes

Item	Fault/ Mistake		
	Small (0,10)	Medium (0,30)	Big (0,50)
The number of circling movements performed by the gymnast	Get a score of 1.00 points each time a circling and a maximum score of 10 points		
Mistake body when doing a circular motion (not straight when doing a circular motion)			
Mistake in the legs when doing a circular motion (the knee is not straight when doing a circular motion)			
Mistake in the toe when performing a circular motion			
Bend in the arm			
The amplitude of the circular motion			

Data analysis used research persistence-

ce, data triangulation, peer examination, and checking members through discussion. Bodgan in Sugiyono (2007: 89). The results of the data obtained from the research instrument will be systematically arranged, analyzed and finally concluded.

RESULTS AND DISCUSSION

The results of the research that has been carried out resulted in a draft development product in the form of a 2 pommles mushroom apparatus used for circulating training for athletes. The initial products from research and development correspond to **Table 2**.

Table 2. Initial Draft Specifications (Initial Products) two Pommels

Initial Product
The initial product was designed to be used in teaching and preparing movement skills on pommels apparatus, as well as being used for athletes level or level 4, 5 and 6 (junior and senior athletes).
Mushroom heads are made of 2 mm thick steel plate, concrete iron, rebondeed foam, ATI foam, and oskar cloth.
Can be raised and lowered, with a minimum height of 50 cm and a maximum of 60 cm.
Empowering the community (upholsterers and blacksmiths and welders).
Local ingredients.
Made manually.
The mushroom head diameter is 60 cm
Weight 35 Kg.
Affordable price, which is Rp. 4,000,000.

This product of the development model of pommels mushroom apparatus has 3 (three) main parts; part 1 (one) is the top of the mushroom apparatus, or mushroom head, consisting of a combination of an iron plate with a thickness of 2 mm and a diameter of 60 cm, ATI foam with a thickness of 6 mm, rebondeed foam with a thickness of 2 cm, and colored oskar skin. light brown. It is a circle with a diameter of 60 cm and the thickness of the top is 5 cm. On the head of the mushroom is installed a pommels made of fiber. Part 2 (two) is the middle part of the mushroom, is an iron pipe with a diameter of 2 cm. There are two iron pipes that are used to support the mushroom head. In the middle of the mushroom a jack is installed to make it easier to raise and

lower the mushroom apparatus. In the center of the mushroom, a 30 cm pipe is installed with the aim of forming a mushroom that has argonomic properties, so it is safer when used by athletes (the gymnast's foot does not touch the mushroom's foot when doing circular motion exercises on the mushroom apparatus). Part 3 (three) is the material for the bottom or base of the mushroom apparatus, in the form of a circle made of iron plate with a thickness of 2 mm. At the bottom of the mushroom base is added ATI foam with the aim that the mushroom base is not slippery when the mushroom apparatus is used for circling exercises in the mushroom apparatus.

This research and development step is in line with research from (Sumarsono & Wasa, 2019) which states that the initial product is an important part of research and development. The initial product produced is based on an analysis of needs in the field, according to the needs for gymnastics facilities as well as to improve the quality of athlete's movement. After the initial product has been completed, the next step is to conduct a validity test by an expert. Based on the judgment of the experts, the results are in accordance with **Table 3**.

Table 3. Two Pommles Mushroom Apparatus Assessment from Gymnast and Equipment Expert

Criteria	Rated aspect	Assessment Aspects			
		A1	A2	A3	A4
Originality	The researcher's own work	10	9	9	10
	Has a distinguishing feature compared to similar sports technologies (originality)	4	5	4	4
	Has a distinguishing feature with existing products	5	4	5	5
Advantages of Development Results	Has an advantage in terms of development results.	10	9	9	8
	Has an advantage in terms of product manufacturing materials.	5	4	4	4
	Has advantages in terms of operation of mushroom tools	4	5	5	5
	Has advantages in terms of maintenance of mushroom tools	4	4	4	5

Expe- diency	Has high utility for a wide audience in supporting efforts to development of male artistic gymnastics athlete in Central Java.	15	15	15	15
	Has positive power from the application of technology.	5	4	4	5
Econ- omy	The development of a saddle mushroom prototype tool can lead to other industries (Multiplayer Effect)	5	5	4	4
	Has commercialization potential and market reach.	10	10	10	10
Safety	Has a good level of safety for junior male artistic gymnastics athletes	5	5	5	5
	Has a good level of safety for senior male artistic gymnastics athletes.	5	5	5	5
Com- fort	Has a good level of comfort for junior male artistic gymnastics athletes	5	5	5	5
	Has a good level of comfort for senior male artistic gymnastics athletes	5	5	5	5
Total Score		97	94	93	95

Information:

- A1: Gymnast 1
- A2: Gymanast 2
- A3: Equipment Expert 1
- A4: Equipment Expert 2

The expert's assessment stated that the two pommels mushroom apparatus received 90% expert ratings with the category that it could be used / continued to the small and large scale test stage.

The next step is a small-scale test using a sample of 6 athletes. The results of the small-scale test produce suggestions and input in accordance with **Table 4**.

Table 4. Small Scale Result

Revision	Argument	Suggestion
Pommels Mushroom	There is still movement in the pommel when used for circling training. The distance between the pommel and the mushroom head is still too high.	At the base of the mushroom head is given a bearing for the installation of the mushroom pommel so that the mushroom pommel is more stable when used. The distance between the pommel and the mushroom head is shortened.
The top of the mushroom	Too slippery Still less flat	Added ATI foam to the mushroom base so that it is flat and not slippery.

After the product repair is complete, the next step is a large-scale test. In the large-scale test using a sample of 10 athletes with the results of the large-scale test according to **Table 5**.

Table 5. Large Scale Result

Name	Many Circle	Fault					Amplitude
		Body	Leg	Toe	Arm		
Ex-1	3	S	M	S	S	S	
Ex-2	3	M	S	S	S	S	
Ex-3	2	M	M	S	S	M	
Ex-4	3	M	S	S	M	M	
Ex-5	2	M	M	S	S	M	
Ex-6	2	L	M	S	M	M	
Ex-7	2	M	M	S	S	M	
Ex-8	1	L	M	S	M	M	
Ex-9	1	M	M	S	S	S	
Ex-10	2	M	S	S	S	M	

Based on the results of small scale **Table 4** and large scale **Table 5** tests, as many as 16 athletes stated that the two pommels mushroom apparatus with can be used as a training apparatus for athletes to improve circler movement training in the pommels apparatus. This is in line with (Herlambang, 2017) which states that in the deve-

lopment of sports achievements, gymnastics and rhythmic aerobics are also part of gymnastics. So it needs to be improved on an ongoing basis. The trainer involved in the interview stated that the two pommels mushroom apparatus was an effective means of overcoming the constraints of both lack of facilities as well as training advice for athletes. The success of training is also influenced by positive factors, this is in line with (Chanal, 2005) which states that the success of training is also praised by the concept of understanding given from the trainer. Anthropometric measurements are also influential in the success of a basic technique in gymnastics (Campbell, 2000). Other research also states that the success of implementing motion is also influenced by age, when athletes do exercises from an early age, it will make it easier to recognize a movement (Garcia, 2011). Another important thing is the circular motion of the mushroom apparatus including the anaerobic endurance (Sands, 2006).

CONCLUSION

The two pommels mushroom apparatus has certain specifications and specialties so that it can be used as a training apparatus for male artistic gymnastics athletes in Central Java. The two pommels mushroom apparatus so it can be used for circler training before athletes train in the real apparatus, namely the pommels mushroom apparatus. The development of two pommels mushroom apparatus can be a means of overcoming the limited facilities for gymnastics in Central Java.

REFERENCES

- Baudry, L., Leroy, D., Thouwarecq, R., & Choller, D. (2006). Auditory concurrent feedback benefits on the circle performed in gymnastics. *Journal of Sports Sciences*. <https://doi.org/10.1080/02640410500130979>
- Baudry, L., Sforza, C., Leroy, D., Lovecchio, N., Gautier, G., & Thouwarecq, R. (2009). Amplitude variables of circle on the pedagogic pommel horse in gymnastics. *Journal of Strength and Conditioning Research*. <https://doi.org/10.1519/JSC.0b013e3181a00be8>
- Campbell, R. A., Bradshaw, E. J., Ball, N., Hunter, A., & Spratford, W. (2020). Inertial measurement units are 'all g': Inter-trial reliability when assessing upper and lower body impact loading in artistic gymnastics. *International Journal of Sports Science & Coaching*, 1747954120970310.
- Chanal, J. P., Marsh, H. W., Sarrazin, P. G., & Bois, J. E. (2005). Big-fish-little-pond effects on gymnastics self-concept: Social comparison processes in a physical setting. *Journal of Sport and Exercise Psychology*, 27(1), 53-70.
- Culjak, Z., Miletic, D., Kalinski, S. D., Kezic, A., & Zuvella, F. (2014). Fundamental movement skills development under the influence of a gymnastics program and everyday physical activity in seven-year-old children. *Iranian journal of pediatrics*, 24(2), 124.
- Fujihara, T., Fuchimoto, T., & Gervais, P. (2009). Biomechanical analysis of circles on pommel horse. *Sports Biomechanics*. <https://doi.org/10.1080/14763140802629974>
- Fujihara, T., & Gervais, P. (2012a). Circles on pommel horse with a suspended aid: Mass-centre rotation and hip joint moment. *Journal of Sports Sciences*. <https://doi.org/10.1080/02640414.2012.695078>
- Fujihara, T., & Gervais, P. (2012b). Circles with a suspended aid: reducing pommel reaction forces. *Sports Biomechanics*. <https://doi.org/10.1080/14763141.2011.637124>
- Garcia, C., Barela, J. A., Viana, A. R., & Barela, A. M. F. (2011). Influence of gymnastics training on the development of postural control. *Neuroscience Letters*, 492(1), 29-32.
- Herlambang, T. (2017). Aerobic Gymnastics Sebagai Pembelajaran Aktivitas Ritmik Pada Pendidikan Jasmani Olahraga dan Kesehatan. *Jendela Olahraga*. <https://doi.org/10.26877/jo.v2i1.1286>
- Hsieh, S. S., et al. (2017). Effects of childhood gymnastics program on spatial working memory. *Medicine & Science in Sports & Exercise*, 49(12), 2537-2547.
- Nassar, L. (2017). Gymnastics. In *Foot and Ankle Sports Orthopaedics*. https://doi.org/10.1007/978-3-319-15735-1_55
- Sands, A., Friemel, F. R. A. N. C. O. I. S. E., Stone, M. H., & Cooke, C. B. (2006). Any effect of gymnastics training on upper-body and lower-body aerobic and power components in national and international male gymnasts?. *Journal of strength and Conditioning Research*, 20(4), 899-907.
- Soenyoto, T. (2014). Pengembangan Prototipe Alat Jamur Cabang Olahraga Senam Artistik Putra Di Provinsi Jawa Tengah. *Journal of Physical Education Health and Sport*, 1(1), 1-8. <https://doi.org/10.15294/jpehs.v1i1.3005>
- Sumarsono, A., & Wasa, C. (2019). Pengembangan Senam Kebugaran " Kitorang Bersatu" Pada Suku Marind Papua. *Jendela Olahraga*. <https://doi.org/10.26877/jo.v4i1.2417>