



Research Paper

The Effect of Functional Strength Trainings on Some Basic Skills of Amputee Football Players in The Palestinian National Team

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Study summary

This study aimed to identify the effect of functional strength training on some basic skills of amputee football players in the Palestinian national team. The researchers used the experimental method in conducting this study on a study sample of 24 amputee football players from the Palestinian national team. The study sample was divided into two groups: experimental and control. The study findings revealed that (kicking the ball) skill improved by 35.16%, (running with the ball) skill improved by 31.84%, (juggling the ball) skill improved by 42.32%, (heading the ball) skill improved by 31.19% and (dribbling and shooting) skill improved by 11.74%.

Keywords: functional strength, basic skills, amputee football.

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Introduction

Scientific research is considered as the best method through which various scientific theories in the field of sports training can be verified, benefited from and adapted to serve sports and its development. (Al-Aqra', 2013, 494).

has Sports training improved significantly in our time due to adopting sound scientific research methods when designing scientific studies and solving their problems to reach the highest practical sports level. (Ibrahim, 2021, 10)

Sports training also aims to achieve sports level by developing the players' levels and utilizing their skills, physiques and tactics in competitions. Relatively, functional strength training is considered new forms of trainings in sports. (Al-Hani and Ismail, 2020, 32)

Many studies are concerned with the subject of functional strength training. Enezi-Al (2021), which aimed to identify the effect of functional strength training on some skill variables of junior football players in Kuwait, concluded that functional strength training improved the junior football players' skills. In the same context, Ibrahim (2021) aimed to identify the effect of functional strength training on core muscles strength and digital level of junior high jump athletes. The study then found out that functional strength training improved back, abdominal and leg muscles, mobile and fixed balance, digital level of junior high jump athletes. Saut, Salih and Ertugrul (2019) suggested that functional training has positive effect on junior tennis players' basic skills. In addition, Sliva and others (2018), which aimed to identify the strength indicators of amputee football players, showed that the player's abilities have improved as a result of the used suggested training program. Moreover, Tikfa and others (2020), which aimed to identify the effect of functional strength training on compatible abilities. The study revealed that functional strength training had a positive impact on the skill and physical abilities in football.

Persons with disabilities in Palestine constitute 2.1% of the total population; 48% in the West Bank and 52% in Gaza Strip according to the data of the Population, Housing and Establishments Census, 2017. (Palestinian Central Bureau of Statistics, 2019)

In the same regard, sport in Palestine faces many problems to level up due to many challenges, mainly the "Israeli" occupation, that impede its development in the field of sports in general and of athletics for persons

with disabilities in particular; as athletics is one of the main competitive sports that requires players to have certain abilities, primarily challenging themselves to reach higher levels. (Al-Aqra', 2011, 124)

In the light of the foregoing, the researchers believe that functional strength training has a key role in improving the running and jumping speed for the amputee football players and also in reducing the injury rate, and thus improving the skill performance.

Parasports are considered a competition-oriented sports, in both the Olympic and international sport fields. It also has its own registered levels and records, whether in individual, team or digital sports.

Parasports in Palestine first gained attention in 1993 when the Palestinian federation of parasports was established. Then the federation was more developed in the West Bank and the Gaza strip through establishing more clubs and teams for people with disabilities. Subsequently, Palestine got its first medal in the Paralympic as Husam Azzam claimed bronze in the F53 shot put at the 2000 Games in Sydney. Other medals were also won at the 2004 Olympic Games in Athens.

The Palestinian amputee football national team is currently preparing to participate in the West Asian Amputee Football Championship- Kish Island Iran-, to secure a berth in the 2022 Amputee Football World Cup in Turkey. The Palestinian amputee football national team had few team members when first established in 2019 under the supervision of the International Committee of the Red Cross – Palestine. However, it now has 80 players from different 5 clubs as well as 15 referees, 10 coaches and junior team of 60 players. It is worth mentioning that the Palestine Amputee Football Association joined the World Amputee Football Federation in 2021.

Thus, the current study sheds light on the possible methods that would improve the skills of the Palestinian amputee football national team players. It also endeavors to identify the effect of functional strength trainings on such an important category of sports in Palestine.

The significance of this study lies in identifying the effect of functional strength trainings on some basic skills of the Palestinian amputee football national team players.

Statement of the problem

Sports kinetic performance is generally characterized by complexity, especially in amputee football, due to its overlapping parts.

In addition, functional strength is one of the basic parts needed to achieve kinetic performance in football. Players have to consider the possibility of being suddenly attacked by a football shot which may make him or her lose balance while moving; therefore, shooting the balls when attacking has to be strong and balanced, as well as strong and fast. (Hamed and others, 2018, 3-4)

Although most of the studies reviewed by the researchers confirm the significance of using functional strength training to develop kinetic performance level, the researchers- to their best knowledge- did not find any previous Palestinian study which deals with utilizing the functional strength training when training amputee football players.

Thus, the problem of this study can be identified as an oriented process to identify the effect of using functional strength training on some basic skills of the amputee football players in the Palestinian national team.

Study Questions

The study addresses the following major question:

Do functional strength trainings have an effect on some basic skills of the amputee football players of the Palestinian national team?

The following sub-questions are derived from the major question of the study:

1. Are there statistically significant differences between the pre and post measurements of the experimental group for some basic skills of the amputee football players in the Palestinian national team?
2. Are there statistically significant differences between the pre and post measurements of the experimental and control groups for some basic skills of the amputee football players in the Palestinian national team?

Study Objectives

This study aims to achieve the following:

1. Identifying the differences between the pre and post measurements of the experimental group for some basic skills of the amputee football players in the Palestinian national team.
2. Identifying the differences between the pre and post measurements of the experimental and control group for some basic skills of the amputee football players in the Palestinian national team.

Study hypotheses

1. There are statistically significant differences between the results of the pre and post measurements of the experimental group for some basic skills of the amputee football players in the Palestinian national team, in favor of the post measurement.
2. There are statistically significant differences between the results of the pre and post measurements of the experimental and control group for some basic skills of the amputee football players in the Palestinian national team, in favor of the experimental group.

Definition of key terms

1. **Functional strength trainings:** it is a combination of strength and balance exercises performed simultaneously through integrated and multi-levels movements (frontal, transverse, sagittal); and it includes: acceleration, stabilization, and deceleration, with the aim of improving kinetic ability, core strength (pelvis and spine) and muscular and neurological efficiency. (Al-Anzi, 2021, 6)
2. **Basic skills:** are football players' basic skills; they are two types: basic skills without ball (running and changing direction, jumping, body camouflaging and positioning), basic skills with ball (passing, receiving, running with the ball, dribbling and shooting). (Al-Hani and Ismail, 2020, 57)

Study procedures

- **Study methodology:** the researchers adopted the experimental method with pre and post measurements for both the experimental and control groups to meet the nature of this study.
- **Study sample and population size:** the researchers chose the study sample using the purposeful sampling, composed of 24 amputee football players from the Palestinian national team, divided into two groups: experimental and control.

Table (1)
arithmetic mean, standard deviation, median, and skew coefficient
for the research sample

n = 24

Variables	Measurement Unit	Experimental Group		Control Group		Median	Skew Coefficient
		Arithmetic Mean	Standard Deviation	Arithmetic Mean	Standard Deviation		
Key Variables							
Hight	cm	174	4.52	176	6.76	176	-0.54
Weight	kg	68.42	8.02	69.42	10.31	71.5	-1.12
Age	Month Year	25.42	6.56	28.75	7.01	27	0.51
Training Age	Month Year	7.29	4.1	7.09	4.44	6	0.91
Experimental Variables							
Ball kicking skill	count	3.08	0.99	2.25	0.97	3	0.26
Running with the ball skill	s	13.83	2.37	14.67	1.07	14	0.5
Juggling the ball skill	count	10.67	10.28	6.42	4.19	6.5	2.16
Heading skill	cm	4.5	0.93	3.33	0.96	4	-0.10
Dribbling and shooting	s	11.14	0.76	11.95	0.91	11	0.21

The skew coefficient values presented in table (1) suggest that the study samples have non-equilibrium distribution flaws, as the skew coefficients values in all variables ranged (± 3) which indicates samples equivalence.

Scientific coefficients of validity and reliability of skill tests:in order to investigate the validity and reliability of the skill tests, the researchers conducted the validity test onan experimental group made of (3) players, and on a control group made of (3) players “excluded from the national team”, andnot belonging to the study sample on SundayDec 5, 2021.The reliability test wasapplied on the experimental group after a week from the first test application, fromSundayDec 5, 2021until SundayDec 12, 2021, applying the same measurement conditions; then the correlation coefficient of the two test applications on the pilot sample.The following are the results of the validity and reliability tests, as shown in Tables (2) and (3).

Table (2)

The validity coefficient of the skilltests under study of the experimental and control groups for the skill variables under study

n = 6

Variables	Measurement Unit	Experimental group (n = 3)		Control group (n = 3)		MD	T Value
		M	S.D	M	S.D		
Ball kicking skill	count	3.67	0.58	1.67	0.58	2	*4.24
Running with the ball skill	s	16.33	0.58	18.67	0.58	-2.34	*4.95
Juggling the ball skill	count	7.67	2.08	3.67	1.53	4	*2.68
Heading skill	cm	4.8	0.53	3	0.5	1.8	*4.28
Dribbling and shooting	s	13	1	15.67	1.15	-1.33	*3.02

•Tabular T-value at the level of **0.05 = 2.015**

Table (2) shows that there are statistically significant differences between the two groups in the skill tests in favor of the experimental group, which indicates the validity of the tests under study. The value of (T) ranged between 2.68 as the lowest value, and 4.95 as the highest value. By comparing the value of Tabular (T) and of Calculated (T), a significance level is found, the thing that indicates a high degree of the tests’ validity.

Table (3)

The reliability coefficient of the skill tests under studyof the first and second applications
n = 3

Variables	Measurement Unit	First Application		Second Application		R
		M	±S.D	M	±S.D	
Ball kicking skill	count	3.67	0.58	3.63	0.4	*0.929
Running with the ball skill	s	16.33	0.58	16.8	0.46	*0.945
Jugglingthe ball skill	count	7.67	2.08	6.67	1.15	*0.971
Heading skill	cm	4.8	0.53	4.4	0.53	*0.929
Dribbling and shooting	s	13	1	14.73	0.87	*0.973

•Tabular R-value at the level of **0.05 = 0.9**

Table (3) shows that there is statistically significant correlation between the first and second application at significance level 0.05.The value of the correlation coefficient R ranged between 0.929 as the lowest value, and 0.973 as the highest value. By comparing the value of Tabular (R) and of Calculated (R), a significance level is found, the thing that indicates a high degree of the tests’ reliability.

The functional strength training program design

With to the sources and studies that dealt with functional strength training, the researchers followed thereference following steps when designing the training program:

1. Checking the availability of safety measures, and considering the wave-like loading principle, program flexibility and the exercises arrangement within the training program, mainly due to the fact that it is applied on amputee football players.
2. Identifying the purpose of the training program, that is creating a positive effect on some basic skill of amputee football players of the Palestinian national team.
3. Taking into account that trainings have to include: (core stability) few repetitions of medium intensity with gradual increase, to achieve neuromuscular control of the core muscles. (Core strength) using external resistance exercises to achieve motor integration and muscular strength. (Core ability) movements characterized with strength and instant speed.
4. The training program lasted for 12 training weeks, with 4 training sessions a week - 90 minutes each, 48 training sessions in total. The functional training sessions were graded from 60% _ 90% of the maximum load.

Measurements

The researchers took the pre-measurement of the skill tests on Tuesday Dec 14, 2021 and then the post-measurement on Thursday Feb 24, 2022.

Findings and Discussion

The discussion of the findings of the first hypothesis, which suggests that there are statistically significant differences between the results of the pre and post measurements of the experimental group for some basic skills of the amputee football players in the Palestinian national team, in favor of the post measurement.

Table (4)

The difference between pre and post measurement, the two arithmetic means, the rate of change, and the calculated(T) value

n = 12

Experimental Variables	Measurement Unit	Pre measurement		Post measurement		DM	ROC	T value
		M	S.D	M	S.D		%	
Ball kicking skill	count	3.08	0.99	4.75	0.45	0.95	35.16	*6.15
Running with the ball skill	s	13.83	2.37	10.49	1.04	-3.34	31.84	*4.96-
Juggling the ball skill	count	10.67	10.28	18.5	11.6	7.83	42.32	*11.28
Heading skill	cm	4.5	0.93	6.54	1.29	2.04	31.19	*8.16
Dribbling and shooting	s	11.14	0.76	9.97	0.85	-1.17	11.74	*7.11-

•Tabular T-value at the level of **0.05 = 1.796**

Table 4 shows that there are statistically significant differences in the pre and post measurement of the skill tests. The data analysis in the above table shows the following: the improvement rate of the (ball kicking) skill is 35.16%, the improvement rate of the (running with the ball) skill is 31.84%, the improvement rate of the (juggling the ball) skill is 42.32%, the improvement rate of the (heading) skill is 31.19%, the improvement rate of the (dribbling and shooting) skill is 11.74%.

The researchers attribute the improvement rate to the effect of the proposed program using functional strength trainings. The trainings were also varied in order to improve the basic skills through applying stretching and flexibility exercises which increased the muscle strength and thus the speed of muscle contraction, resulting in improving the skill performance of the players.

This result agrees with many studies like the study of Andersen and others (2014) which suggested that functional strength trainings have significant effect on football players’ kinetic performance. The study of Sliva and others (2019) also confirmed that the functional strength training program improved the strength indicators of the amputee football players.

Moreover, the study of Tekfeh (2020) confirmed that functional training, through using varied tools, contributes positively to improving skill performance. The study of Jones Ron (2003) also agreed that functional strength training is considered a newly used form of training in the sports field, and that lower extremity muscles are essential muscles needed to achieve body stability and balance.

Furthermore, the study of Al-Azzawi and Noman (2016) concluded that functional strength training supports and improves skill performance. The study of Fabio Comana (2004) also agreed that functional

strength training includes balance exercises such as standing on one foot while moving other body parts without falling down. Such exercises result in improving players' performance.

Thus, the researchers believe that functional strength trainings managed to connect the upper and lower extremities by focusing the exercises on one side; therefore, the player's basic skills improved quickly and notably. This totally agrees with the study of Sayed (2021) which confirmed that functional strength trainings began to be used in training programs for athletes in different sports and games as a preferred way for developing athletic performance and achievement as well.

The discussion of the findings of the second hypothesis, which suggests that there are statistically significant differences between the results of the pre and post measurements of the experimental and control groups for some basic skills of the amputee football players in the Palestinian national team, in favor of the experimental.

Table (5)

The difference between pre and post measurement, the two arithmetic means, the rate of change, and the calculated (T) value

n = 24

Experimental Variables	Measurement Unit	Experimental group		Control group		DM	T value
		M	S.D	M	S.D		
Ball kicking skill	count	4.75	0.45	3.25	0.45	1.5	*8.12
Running with the ball skill	s	10.49	1.04	13.41	0.93	2.92	*7.22
Juggling the ball skill	count	18.5	11.6	9.25	3.05	9.25	*2.67
Heading skill	cm	6.54	1.29	4.16	1.24	2.38	*4.61
Dribbling and shooting	s	9.97	0.85	11.38	1.1	1.41	*3.55

•Tabular T-value at the level of **0.05 = 1.717**

Table 5 shows that there are statistically significant differences in the pre and post measurement of the basic skills tests. The data analysis in the above table shows the following: The T value of the (ball kicking skill) test is 8.12, the T value of the (running with the ball skill) test is 7.22, the T value of the (juggling the ball skill) test is 2.67, the T value of the (heading the ball skill) test is 4.61, the T value of the (dribbling and shooting skill) test is 3.55.

Based on the results presented in the previous table, the researchers confirm that the functional strength exercises used in the training program were compatible with the players' anatomical nature and thus had a positive impact on the basic skills of control group exercises.

This result agrees with many studies like the study of Al-Anzi(2021) which revealed that the group received the functional strength trainings had better results than the group received regular trainings. The study of Ibrahim (2021) also suggested that functional strength trainings had positive impact the skills performance, core muscles and digital level of the high jump junior players.

Additionally, the study of Sawczyn (2020) agreed that functional training has a role in improving the individual level and in preventing injuries. The study of Tomllanovic and others (2011) also confirmed that functional training is a more innovative alternative method for improving players performance. Further, we have the study of Suat, Salih and Ertugrul (2019) which suggests that functional training achieved higher rates of improvement compared to traditional training. Besides, it developed the basic skills of the tennis players.

Conclusions

In light of the research objectives, hypotheses, research sample and statistical method, and depending on the findings and their interpretation, the researchers found the following:

1. There are statistically significant differences between the results of the pre and post measurements of the experimental group for some basic skills of the amputee football players in the Palestinian national team, in favor of the post measurement. As the skills under study improved as follows: Kicking the ball improved by 35.16%, running with the ball by 31.84%, juggling the ball by 42.32%, heading the ball by 31.19% and dribbling and shooting by 11.74%.
2. There are statistically significant differences between the results of the pre and post measurements of the experimental and control groups for some basic skills of the amputee football players in the Palestinian national team, in favor of the experimental group.

Recommendations

1. Utilizing functional trainings, primarily, when designing training programs for amputee players.
2. Emphasizing the use of assistive devices, tools and programs in functional strength training programs.
3. Conducting more studies on the effect of using functional strength on amputee players' physical qualities.
4. Utilizing functional strength training programs to train players in accordance with the nature of the sport that focuses on one of the extremities.
5. Conducting comparative studies of the effect of functional strength trainings and other training methods.

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