



Effect of protective training to reduce some of the knee joint injuries on the artificial grass playground on the junior soccer players

Alhofy, Mahmoud¹ Yousef, Abdel Halim² Torky, Mahmoud³ Shehab, Ahmed⁴

Abstract

Football is considered the number one popular sport in most countries of the world, due to its characteristics that distinguish it from other sports. The level of performance in football in recent years has reached a stage of outstanding general performance in all physical, psychological, mental and tactical aspects, due to This aims to develop scientific equipment, auxiliary tools and scientific methods in training players, as well as the results of studies and scientific research. Sports injuries are considered one of the most important factors that lead to the exclusion of athletes and their isolation from regular training operations or participation in competitions. It is also considered one of the most important problems facing all workers in the sports field. It is also necessary to identify the factors that help the emergence and spread of injuries and know their causes, places and types, especially for football players, injuries may be one of the reasons for their isolation or exclusion from participating in sporting events, and thus losing teams

Keywords: football, knee, Injuries

Introduction and research problem:

- Football is considered the number one popular sport in most countries of the world, due to its characteristics that distinguish it from other sports. The level of performance in football in recent years has reached a stage of outstanding general performance in all physical, psychological, mental and tactical aspects, due to This aims to develop scientific equipment, auxiliary tools and scientific methods in training players, as well as the results of studies and scientific research. (3:15)

- Sports injuries are considered one of the most important factors that lead to the exclusion of athletes and their isolation from regular training operations or participation in competitions. It is also considered one of the most important problems facing all workers in the sports field. It is also necessary to identify the factors that help the emergence and spread of injuries and know their causes, places and types, especially For football players, injuries may be one of the reasons for their isolation or exclusion from participating in sporting events, and thus losing teams. (1154:16)





- **Medhat Qassem (2006)** mentions that the quality of the stadiums is of great importance in the occurrence of injuries or the protection of players from them, as the quality of the ground and its validity, such as levelness, hardness, the absence of obstacles, voids, protrusions, pointed ends, or any things that impede the movement of players or potentially damage their presence. Considering that the spaces surrounding the stadium are sufficient for the players to rush during the movement, so as not to clash with the pillars or obstacles surrounding the stadium (21:56).

- The development that took place in football and the dependence of each skill on the other and its speed of performance and the player's high effort during the two halves of the match, the playing field is a major cause of injuries to the lower extremity.

- Through the interest of the Ministry of Youth and Sports to provide paved playgrounds within clubs and youth centers represented in natural grass and artificial grass fields, which have recently increased significantly, whether at the competitive, training or recreational level (13:8).

- **Osama Kamel Ratib (2002)** points out that suitable stadium floors protect players from injuries. (22:12). And **Andrea Freti (2005)** adds that injury is one of the important factors that cause

repeated injuries, and the more hard the flat, the more cases of injury (12:10).

- Through the above and based on the work to reduce knee joint injuries as a result of playing on artificial grass pitches, and through the reference survey of research and specialized scientific references, the researchers noticed an increase in the percentage of

- Injuries among players, especially injuries to the knee joint, with the consequent negative effects on performance, which prompted the researchers to think about designing a preventive training program to reduce some knee injuries on the fields of artificial grass for young footballers

Research goal:

- Identifying the effect of a proposed preventive training program to reduce some knee joint injuries on the artificial turf pitches for junior footballers.

Research hypotheses:

- Through the research problem and its goal, the researcher assumes the following:

- There are statistically significant differences between the mean of the tribal and remote measurements of the experimental group in the physical abilities and the frequency of knee joint injuries in favor of the post measurement.

- There are statistically significant differences between the mean of the pre and post measurements of the control





group in the physical abilities and the frequency of knee joint injuries in favor of the post measurement

- There are statistically significant differences between the means of the dimensional measurements of the experimental and control groups in the physical abilities and the frequency of knee joint injuries in favor of the dimensional measurements of the experimental group.

Terms used in the search:

Preventive training program:

- It is a set of standardized physical exercises aimed at strengthening the muscles working on the knee joint and working to reduce injuries to this joint. (Procedural definition)

Lower extremity injuries (knee joint) .

- Disruption or obstruction of an external influence on the functioning of the tissues and organs of the knee joint in the athlete. This influence is often sudden and severe, resulting in functional and anatomical changes that limit the motor work of the joint (18-8).

Search procedures:

Research Methodology:

- The researcher used the experimental method due to its relevance to the nature of this research, through the experimental design of two equal groups, one experimental and the other controlling.

The research sample:

- The research sample was chosen in a deliberate way from football juniors under 18 years old at Sars El-Layan Sports Club, Menoufia Governorate, for the 2019/2020 sports season, and those registered in the Menoufia football records, where the sample size reached (30) young players, they were distributed into two groups, one of them experimental, amounted to (15) junior and the other was control, and amounted to (15) juniors, and the researcher chose (15) juniors from the same age group at Menouf Sports Club to calculate the scientific transactions for the tests and to conduct exploratory studies for research.

The homogeneity of the research sample:

- The researchers calculated the homogeneity between the members of the research sample in growth rates (age, height, weight) and training age

(table1)

Description of the research sample as a whole n = 30

variables	measuring	Arithmetic average	mediator	Standard deviation	Skew modulus
Age	year	18.433	18.400	0.209	0.470
Height	poison	172.867	172.000	4.562	0.256





Weigh	kg	65.400	65.000	5.757	0.003
Training age	year	5.833	6.000	0.950	0.163-

The results of the table refer to the arithmetic mean, standard deviation, and skew coefficient of the growth variables for the two research sample groups. It also shows the moderation of the distribution of the total research sample individuals in these variables, where the skew coefficient ranged between (± 3 .)

Table (2)

Characterization of the research sample in the physical variables in the tribal measurement for the two groups n = 30

μ	measuring	measuring	Arithmetic average	mediator	Standard deviation	Skew modulus	
1	Agility	The second	8.416	8.325	0.287	0.338	
2	flexibility	poison	1.467	2.000	2.968	0.405-	
3	balance	The second	42.037	41.810	5.879	0.254	
4	Motor ability	poison	27.731	27.00	4.592	0.389	
5	strength	Leg muscles	k.g	36.333	37.500	7.980	0.142-
6		Anterior muscle	The second	9.167	9.000	1.341	0.141-

The results of the table refer to the arithmetic mean, standard deviation, and skew coefficient of the physical research variables in the tribal measurement of the total research sample.

(Table 3)

The significance of the differences between the experimental group and the control group In the physical variables in the tribal measurement

measuring	The group	total	Average wage	total ranks	Z value	indication
Agility	Experimental	15	15.43	231.50	0.042	0.967
	control	15	15.57	233.50		
	The total	30				
flexibility	Experimental	15	15.80	237.00	0.188	0.851
	control	15	15.20	228.00		
	The total	30				
balance	Experimental	15	15.07	226.00	0.270	0.787
	control	15	15.93	239.00		
	The total	30				
Motor ability	Experimental	15	13.88	180.50	0.258	0.797





		control	15	13.12	170.50		
		The total	30				
strength	Leg muscles	Experimental	15	15.57	233.50	0.042	0.966
		control	15	15.43	231.50		
		The total	30				
	Anterior muscle	Experimental	15	15.73	236.00	0.148	0.882
		control	15	15.27	229.00		
		The total	30				
		control	15	15.50	232.50		
		The total	30				

The tabular value of "y" at the 0.05 level of significance is 1.96

The results of the table indicate that there are non-statistically significant differences between the experimental group and the control group in the physical variables, which indicates the equality of the two groups in the variables used under research.

Means and tools for data collection reference survey

- By reviewing and surveying - whenever possible - on scientific references, research and previous studies related to the topic of research, reference survey and specialized references, which dealt with the main axes of this research in terms of determining the most important measurements and common and appropriate tests.

Expert opinion poll

- The researchers surveyed the opinion of (5) experts to determine the physical elements associated with knee joint injuries selected in the research, and the elements of the proposed preventive training program. And muscle strength exercises working on the knee joint.

Tools and equipment used in research

- Medical scale, injury testing lab, gym, soccer balls, football field (artificial turf), cones, tape measure, rheostat device to measure length (cm), balance discs, plastic, stopwatch.

The first:

- The researcher conducted the first exploratory study on Monday and Tuesday 17/6/18/2019 on a survey sample consisting of (15) originating from Menouf Sports Club and from outside the main research sample, and it aimed to:

- Reviewing the validity of the tools and devices used, the places of application of the tests in the program, their safety, and the training of assistants.
- Review the specifications, conditions and procedures for applying tests and measurements.





- Calculation of the scientific transactions selected in the research.

Scientific Transactions

Calculation of the validity coefficient of the tests used:

- The researcher calculated the validity coefficient of the physical tests under

study by calculating the validity of the peripheral comparison, by applying it to an exploratory sample consisting of (15) youths from Menouf Sports Club and from outside the main research sample on Wednesday and Thursday 19, 20/6/2019, and the table explain it

(Table 4)

The significance of the differences between the highest quartile and the lowest quartile in physical variables

measuring	The group	total	Average wage	total ranks	Z value	indication	
Agility	Upper spring	5	8.00	40.00	*2.627	0.009	
	Lower spring	5	3.00	15.00			
	The total	10					
flexibility	Upper spring	5	8.00	40.00	*2.643	0.008	
	Lower spring	5	3.00	15.00			
	The total	10					
balance	Upper spring	5	8.00	40.00	*2.611	0.009	
	Lower spring	5	3.00	15.00			
	The total	10					
Motor ability	Upper spring	5	8.00	199.00	2.844*	0.004	
	Lower spring	5	3.00	101			
	The total	10					
strength	Leg muscles	The total	5	8.00	40.00	*2.694	0.007
		Lower spring	5	3.00	15.00		
		The total	10				
Anterior muscle	Upper spring	5	8.00	40.00	*2.694	0.007	
	Lower spring	5	3.00	15.00			
	The total	10					

*The tabular value of "y" at the 0.05 level of significance is 1.96

The results of the table indicate that there are statistically significant differences between the highest quartile and the lowest quartile in the physical variables, which indicates the validity of the variables used in the study.

Calculation of the stability coefficient of the tests:

- The coefficient of stability of the physical tests under study was calculated,





using the method of applying the test and re-applying it (Test-Retest) on the sample of the pilot study in the sports arena in Menouf, which consisted of (15) young people under the same conditions and with the same instructions and at an

interval of 5 days in the period from Wednesday and Thursday 19,20 /6/2019: Wednesday and Thursday 26-27/6/2019, and the table () shows the correlation coefficient between the first and second application

Table (5)

Correlation coefficient between application and re-application in physical variables tests n = 15

no	measruing	application		Application second		Stability coefficient	
		average	deviation	average	deviation		
1	Agillity	8.342	0.294	8.345	0.290	*0.999	
2	flexibility	1.733	2.374	2.133	2.200	*0.978	
3	balance	41.717	6.253	41.731	6.274	*0.999	
4	Motor ability	29.167	4.218	29.00	3.977	0.981*	
5	strength	Leg muscles	36.667	8.997	36.867	8.175	*0.994
6		Anterior muscle	9.133	1.356	9.400	1.352	*0.865

*The tabular value of “t” at the 0.05 level of significance is 0.514

The results of the table indicate that there is a statistically significant correlation between the application and re-application in the physical variables under study, which indicates the stability of the physical variables used under research.

Suggested preventive training program:

Program objective:

- The proposed preventive training program aims to strengthen the muscles working on the knee joint to identify their effect in reducing joint injuries as a result of training and competitions on the floor of artificial grass pitches.

Program foundations:

When designing the training program, the researcher considered the following:

- The proposed program is subject to the use of the plan and the general program objective of the team.
- The suitability of the program to the age group of the research sample.
- Flexibility of the program to the appropriate extent during the period of its application.
- Considering the gradual intensity of the loads over the period of the proposed program.
- Relying on the results of the exploratory study in determining the appropriate starting doses for muscular





strength training for juniors, the research sample.

- The time of the daily training unit in the general program of the team is (90) minutes, (15) minutes for the warm-up, (70) minutes for the main part, (5) minutes for the conclusion.

- The time allocated for muscular strength training ranges between (30:25) minutes from the total time of the main part of the daily training unit in the general program of the team.

- Both the experimental and control groups perform the same program set for the two stages of special preparation, preparing for matches during the preparation period, except for the time allocated for muscular strength training, which is done in the experimental group program only.

- The proposed program was implemented during the stage of general preparation, special preparation, and preparation for matches for a period of (10) weeks, with a number of (3) training units during the week.

- The program includes maximum strength training in the general preparation stage, with repetitions ranging from (1-5) repetitions, in groups (6-8), complete intervals of (2-5) minutes, and endurance of strength in the special preparation stage with repetitions ranging from (15-25) repetitions, with a number of sets (10-12), incomplete intervals of up to (60) seconds, and muscular ability in the pre-competition stage with repetitions ranging between (7-14) repetitions, with a number of sets (3-5), rests A complete interlayer reaches from (2-3) s

Time distribution of the general program of the team and the proposed preventive program:

(table6)

week		first	sec ond	third	four th	fifty	sixth	seven ty	eighth	nine ty	ten th
Degree of pregnancy	maximum			*		*			*	*	
	high		*				*				
	medium	*			*			*			*
Warm up		60	60	60	60	60	60	60	60	60	60
physical preventive exercis	public	30	30	25	20	20	15	10	10	10	10
	special	18	18	23	28	28	33	38	38	38	38
	Maximum power	60	90	-	-	-	-	-	-	-	-
	Strength endurance	30	-	90	90	90	90	30	20	20	20





	Motor ability	-	-	-	-	-	-	60	70	70	70
skills	80	90	100	124	144	164	108	100	90	80	
plans	125	124	102	78	58	38	94	102	112	122	
conclusion	20	20	20	20	20	20	20	20	20	20	20
total											
total	%40 physical			%30 skills			conclusi %30 on				
	1440			1080			1080				

Table (6) shows the time distribution of the program for the preparation period for juniors, the research sample

- Physical, skill, my plans) in the three stages of general and private preparation and preparation for matches during the preparation period (10 weeks), the time distribution of the proposed program using preventive physical exercises during the weeks from the first week to the tenth week.

The second survey:

- The researchers conducted the second exploratory study on the experimental research sample, which consisted of (15) young people
- Experimenting with some program units on the research sample.
- -Standing on the starting point of the program on the training load for each player separately
- Ensure that the assistants understand the nature of the proposed exercises.

The study resulted in:

- Understand the players and assistants of the nature of performance of the selected muscle strength exercises within the training units of the program
- The starting point for the selected strength training exercises was determined according to the individual differences of the research sample players.

Tribal measurement:

- The researcher conducted a tribal measurement on the main research sample on Saturday and Sunday 2.1/7/2019 in the stadiums of Sirs El-Layan Sports Club in Menoufia

Program application period:

- The proposed program was implemented using preventive exercises during the period of general preparation and special preparation
- And the pre-competition period starting from the first week and for a





period of (10) weeks from 3/7/2019 Until 3/9/2019.

Dimensional measurements:

- The researcher conducted a dimensional measurement on the main research sample on Tuesday and Wednesday 4, 5/9/2019 at the Sars El-Layan Sports Club stadium with the same conditions and method of tribal measurement.

Statistical manipulations:

- In statistical data processing, the researcher used the SPSS10 statistical

program for the results of the research, and he used the following treatments:

- Arithmetic mean, standard deviation, skew coefficient, correlation coefficient, (y) Z test, (t) T test, rate of change in the level of performance

Presentation and discussion of the results:

- Through statistical processing of the data obtained by the researcher from his study, he presents these results as follows

First: Presentation and discussion of the results of the first hypothesis

Table (7)

The significance of the differences between the pre-measurement and the post-measurement of the group Experimental physical variables

measuring	direction	total	Average wage	totalranks	Z value	Risk of error	Rate of chang	
Agillity	-	15	8.00	120.00	*3.408	0.001	5.54%	
	+	0	0.00	0.00				
	=	0						
	The total	15						
flexibility	-	0	0.00	0.00	*3.449	0.001	28.27%	
	+	15	8.00	120.00				
	=	0						
	The total	15						
balance	-	0	0.00	0.00	*3.408	0.001	64.18%	
	+	15	8.00	120.00				
	=	0						
	The total	15						
Motor ability	-	0	0.00	0.00	3.207*	0.001	28.22%	
	+	15	7.00	91.00				
	=	0						
	The total	15						
strength	Leg muscles	-	0	0.00	*3.415	0.001	20.55%	
		+	15	8.00				120.00
		=	0					





	The total	15					
Anterior muscle	-	0	0.00	0.00	*3.448	0.001	32.61%
	+	15	8.00	120.00			
	=	0					
	The total	15					

*The tabular value of "z" at the 0.05 level of significance is 1.96

(Table8)

Frequency and percentage of recurrence of injury in the pre and post measurements of the experimental group

Injury type	Degree of injury	tribal		dimensional	
		Repetition	The ratio	Repetition	The ratio
Knee roughness	First degree	4	66.67	2	33.33
	second degree	4	80.00	1	20.00
	Third degree	2	66.67	1	33.33
Knee cartilage rupture	First degree	2	66.67	1	33.33
	second degree	2	66.67	1	33.33
	Third degree	1	100.00	0	0.00

- It is evident from Table (7) that there are statistically significant differences between the tribal and remote measurements of the experimental group and in favor of the post-measurement in the results of all the physical tests under study, as the calculated "y" value was greater than its tabular value at the 0.05 level of significance.

- The results of Table (7) indicate the rates of change in the dimensional measurement of the experimental group, which came in the following order: "balance 64.18%", "maximum strength of the anterior muscle 32.61%", "flexibility 28.27%", "power 28.22%", "dynamometer device to measure Leg muscles 20.55%, agility 5.54%.

- The results of Table (8) indicate the frequency of injuries of different degrees and their incidence rates in the experimental group for the pre-measurement ranged between (66.67% - 100%) and for the post-measurement (zero - 33.33%), where the percentages of recurrence of knee osteoarthritis of the first degree in the tribal measurement were 66.67 While the percentage of injury in the post measurement decreased to 33.33%, and the percentages of recurring the same injury of the second degree in the tribal measurement were 80.00%, while the percentage of injury in the post measurement decreased to 20.00%, while in the third degree the percentages of recurrence of the injury in the tribal measurement were 66.67 While





the incidence of injury decreased in the post measurement to 33.33%, the rates of recurring knee cartilage ruptures of the first degree came to 66.67%, while the percentage of injury decreased in the post measurement to 33.33%, while in the second degree the rates of recurring the same injury in the pre-measurement came 66.67%, while The incidence of injury decreased in the post measurement to 33.33%, and the rates of recurrence of the third degree in the pre-measurement were 100.00%, while the rate of injury in the post measurement decreased to 00.00%

- This is to contain the preventive training program on physical exercises that reduce knee injuries on artificial turf pitches, such as muscle strength, balance, ability, agility and flexibility, which are important qualities for the football player (especially the lower limb) and is used for this to develop and improve the strength of the legs and helps prevent injury The lower extremity, as well as the development of muscular strength of the muscles, the material for the knee joint, as well as the reverse flexor muscles of the knee joint, where the omission of any muscles leads to the occurrence of injury as a result of the lack of balanced development. Muscular strength training during rehabilitation processes helps the

player to quickly restore the player to his level. (2-395)

- This is consistent with what Talha Hussain Hossam (1994) pointed out (11) that the athlete does not only need treatment and physical rehabilitation, but also needs a training program for prevention and limiting injuries so that he can reduce the incidence of injury.

- This is consistent with the results of the study of Ahmed Jalal (2014) (3), Ahmed Attia (2011) (4), Tamer Abdel Razek (2007) (7), Mohamed Abdel Maaboud (2000) (17), Abdel Tawab mourning (2018). (14) The artificial grass pitches and playing on it for long periods leads to the roughness of the knee joint as well as the rupture of the knee cartilage. And the use of preventive physical exercises in all its forms, such as exercises (resistance, plastic, sand, gym equipment, and balance disks) in the preventive program helped reduce knee joint injury for the players under research, and these results verify the validity of what came in the first hypothesis, which states that “there are statistically significant differences between the averages of measurements Before and after the experimental group in physical abilities and in the frequency of knee joint injuries in favor of the dimensional measurement.

Second: Presentation and discussion of the results of the second hypothesis (Table 9)





The significance of the differences between the pre- and post-measurement of the control group in the physical variables

measuring	direction	total	Average wage	totalranks	Z value	Risk of error	Rate of chang	
Agillity	-	12	8.38	100.50	*2.302	0.021	2.33%	
	The total	3	6.50	19.50				
	=	0						
	The total	15						
flexibility	-	0	0.00	0.00	*3.219	0.001	15.36%	
	+	13	7.00	91.00				
	=	2						
	The total	15						
balance	-	2	6.50	13.00	*2.055	0.040	1.59%	
	+	10	6.50	65.00				
	=	3						
	The total	15						
Motor ability	-	0	0.00	0.00	3.199*	0.001	16.29%	
	+	15	7.00	91.00				
	=	0						
	The total	15						
strength	Leg muscles	-	0	0.00	1.857	0.063	1.10%	
		+	4	2.50				10.00
		=	11					
		The total	15					
	Anterior muscle	-	0	0.00	0.00	*2.236	0.025	3.66%
		+	5	3.00	15.00			
		=	10					
		The total	15					

*The tabular value of "z" at the 0.05 level of significance is 1.96

(Table 10)

Frequency and percentage of recurrence of infection in the pre and post measurements of the control group

Injury type	Degree of injury	tribal			
		Repetition	The ratio	Repetition	The ratio
Knee roughness	First degree	5	55.56	4	44.44
	second degree	4	57.14	3	42.86
	Third degree	2	66.67	1	33.33
Knee cartilage rupture	First degree	3	60.00	2	40.00
	second degree	2	66.67	1	33.33
	Third degree	1	50.00	1	50.00





- It is clear from Table (9) that there are statistically significant differences between the tribal and remote measurements of the control group and in favor of the post-measurement in the results of all the physical tests under discussion, as the calculated “y” value was greater than its tabular value at the significance level of 0.05, while there are non-significant differences. Statistically between the pre and post measurements in the strength variable (muscles of two legs).

- The results of Table (9) indicate the rates of change in the post-measurement of the control group, which came in the following order: "ability 16.29%", "flexibility 15.36%", "forward muscle 3.66%", "agility 2.33%", "balance 1.59%" A dynamometer to measure the muscles of the legs 1.10%.

- The results of Table (10) indicate the frequency of injuries of different degrees and their incidence rates in the control group for the pre-measurement ranged between (50.0-57.14%) and for the post-measurement (33.33-50.00%), where the percentages of the recurrence of knee osteoarthritis of the first degree in the tribal measurement were 55.56%, while The incidence of injury decreased in the post measurement to 44.44%, and the percentages of recurring the same injury in the second degree in the tribal measurement were 57.14%, while the

percentage of injury in the post measurement decreased to 42.86%, while in the third degree the percentages of recurrence of the injury in the tribal measurement were 66.67%, while The incidence of injury decreased in the post measurement to 33.33%, the percentages of recurring knee cartilage ruptures of the first degree were 60.00%, while the percentage of injury decreased in the post measurement to 40.00%, while in the second degree, the percentages of recurring the same injury in the tribal measurement were 66.67%, while The incidence of injury decreased in the post measurement to 33.33%, and the percentage of recurrence of the third degree in the pre-measurement was 50.00%, while the incidence of injury decreased in the post-measurement to 50.00%.

- The researchers attributed these differences and percentages of change and improvement in favor of the post-measurement of the control group to the use of the traditional training program that was applied to the members of the research sample during the phases of private preparation and preparation for matches, which amounted to (10) weeks, which also included physical exercises and physical elements such as agility, flexibility, strength and balance. ability and endurance.





- What Taha Ismail and others (1993) ,(13)is that building training programs is one of the most important works that trainers are interested in, especially those codified and organized programs that follow scientific foundations and lead to the development of the player’s condition and make him able to carry out the tasks and duties of the activity he practices, as it achieves adaptation to the devices dynamic player.

- What is confirmed by Hassan Abu Abdo (2013) (9) that planning for sports training is a process of determining what is necessary and important to achieve a specific goal, and this includes determining what can be done and how to perform it and what it takes from the time and place of its implementation and the implementer, as it is considered the basic work to determine and direct the path of any Purposeful sports work, which is the basic rule and the foundation upon which the process of upgrading the training process in the sports field is built.

- Although there are non-statistically significant differences in the dimensional

measurement of the results of some of the physical tests under study, there are improvement rates in the results of some tests that express their development, due to the nature and specifications of the youth in this age group selected for the research sample.

- These results agree with the results of the study of Ibrahim Shaalan (1994) (1), Liu (2002) (24), and Carlos Castagna (2003) (23) which emphasized the need to rely on standardized programs and take into account the intensity and size in training loads. Especially in the young age.

- These results partially validate what came in the second hypothesis, which states that “there are statistically significant differences between the averages of the tribal and remote measurements of the control group in physical abilities and in the percentages of frequencies of knee joint injuries in favor of the dimensional measurement, except for the strength of the muscles of the legs.

Third: Presentation and discussion of the results of the third hypothesis.

Table (11)

The significance of the differences between the dimensional measurement of the experimental group and the dimensional measurement For the control group in the physical variables in the post-measurement

measuring	The group	number	Average wage	totalranks	Z value	indication
Agillity	Experimental	15	11.07	166.00	*2.764	0.006





	control	15	19.93	299.00			
	The total	30					
flexibility	Experimental	15	18.83	282.50			
	control	15	12.17	182.50	*2.105	0.035	
	The total	30					
balance	Experimental	15	23.00	345.00			
	control	15	8.00	120.00	*4.668	0.000	
	The total	30					
Motor ability	Experimental	15	16.81	218.50			
	control	15	10.19	132.50	2.212*	0.027	
	The total	30					
Leg muscles	Experimental	15	19.53	293.00			
	control	15	11.47	172.00	*2.523	0.012	
	The total	30					
strength	Experimental	15	21.87	328.00			
	control	15	9.13	137.00			
	The total	30			*4.008	0.000	
	Anterior muscle	control	15	8.13	122.00		
	The total	30					

*The tabular value of "y" at the 0.05 level of significance is 1.96

(Table 12)

Frequency and percentage of recurrence of injury among the post-measurement of the experimental group And the remote control group

Injury type	Degree of injury	tribal		tribal	
		Repetition	The ratio	Repetition	The ratio
Knee roughness	First degree	4	66.67	2	33.33
	second degree	3	75.00	1	25.00
	Third degree	1	50.00	1	50.00
Knee cartilage rupture	First degree	2	66.67	1	33.33
	second degree	1	50.00	1	50.00
	Third degree	1	100.00	0	0.00

-It is evident from Table (11) that there are statistically significant differences between the tribal and remote measurements of the control group and in favor of the post measurement in the results of all the physical tests under

study, as the calculated “y” value was greater than its tabular value at the 0.05 level of significance.

- The results of Table (12) indicate the frequencies of injuries of different degrees and their incidence rates in the post-





measurement of the experimental group and the control group ranged between (zero %-50%) and for the post-measurement (50%-100%), where the rates of recurrence of knee osteoarthritis were of the first degree in the measurement Tribal 66.67%, while the incidence of injury decreased in the post measurement to 33.33%, and the rates of recurrence of the same injury came from the second degree in the tribal measurement of 75.00%, while the rate of injury in the post measurement decreased to 25.00%, while in the third degree the rates of recurrence of the injury came in the tribal measurement of 50.00 While the incidence of injury decreased in the post measurement to 50.00%, the rates of recurring knee cartilage ruptures of the first degree were 66.67%, while the rate of injury decreased in the post measurement to 33.33%, while in the second degree the rates of recurrence of the same injury in the tribal measurement were 50.00%, while The incidence of injury decreased in the post measurement to 50.00%, and the percentage of recurring injury of the third degree in the pre-measurement was 100.00%, while the incidence of injury in the post-measurement decreased to 00.00%.

- This is because the preventive training program contains physical exercises that reduce knee joint injuries on artificial turf pitches, such as muscle strength, balance,

ability, agility and flexibility, which are important qualities for the football player (especially the lower limb) and is used for this to develop and improve the strength of the legs and helps prevent Injury to the lower extremity, as well as the development of muscle strength of the muscles of the knee joint, as well as the reverse flexor muscles of the knee joint, where the omission of any muscles leads to injury as a result of a lack of balanced development. Muscular strength training during rehabilitation processes helps the player to quickly restore the player to his level.

- This was confirmed by Muhammad Qadri (1999) (19) that the athlete loses his level and misses the competitions due to light injuries, and it is possible that major injuries lead to the end of the athletes' lives, and injuries cost some sports teams major championships, while some teams gained championships due to the completion of the health of their players. .

- This is consistent with the results of the study of Ahmed Jalal (2014) (3), Ahmed Attia (2011) (4), Tamer Abdel Razek (2007) (7), Mohamed Abdel Maaboud (2000) (17), Abdel Tawab mourning (2018). (14) The artificial grass pitches and playing on it for long periods leads to the roughness of the knee joint as well as the rupture of the knee cartilage. And the use of preventive physical exercises in all its forms, such as exercises (resistance





with plastic, sand, gym equipment and balance disks) in the preventive program helped to reduce the knee joint injury for the players in question.

- These results verify the validity of what was stated in the third hypothesis, which states that “there are statistically significant differences between the averages of the dimensional measurements of the experimental group and the dimensional measurements of the control group in physical abilities and in the rates of frequencies of knee joint injuries in favor of the dimensional measurements of the experimental group”.

Conclusions:

- Within the limits of the research sample and its characteristics, and the method used, and according to what was indicated by the results of the statistical analysis and within the scope of this research, the following conclusions could be reached:

- 1- The experimental group achieved a positive superiority for statistically significant differences at the 5% level in the dimensional measurement of the physical aspects (agility, flexibility, ability, balance, strength of the muscles of the legs, strength of the front muscle) with rates of change and improvement that ranged between (5.54% - 64.18%).
- 2- The preventive training program for the experimental group helped reduce the frequency of knee joint injuries (roughness of the knee joint - knee

cartilage rupture) in the dimensional measurement of the program.

- 3- The control group achieved positive superiority for statistically significant differences at the 5% level in the dimensional measurement of physical aspects (agility, flexibility, ability, balance, strength of the muscles of the legs, strength of the front muscle).
- 4- The rates of change and improvement ranged between (1.10% - 15.36%), except for the strength of the muscles of the legs using the dynamometer.
- 5- The preventive training program for the experimental group achieved superiority over the control group with statistically significant differences in physical aspects (agility - flexibility - balance - ability - strength of the thigh muscles - strength of the front muscle) and the percentages of recurrences of knee joint injuries were lower than the control group in the traditional program.

Recommendations:

Within the limits of the research sample, the methodology used, and the statistical treatments, the researcher was able to reach the following recommendations:

- 1- Benefiting from the proposed training program and selected muscular strength exercises in reducing knee joint injuries on artificial grass pitches.
- 2- The necessity of conducting scientific measurements to determine the strength of the muscles working on the





important joints of the body, especially the knee joint, and to form the appropriate loads for each player separately.

3- Conducting a study on different age groups on some joint injuries of **football** players.

Arabic references:

- 1- **Ibrahim Hanafy Shaalan:** The effect of a proposed training program on developing the skill level of soccer juniors, published research, issue 19, Scientific Journal of Physical Education and Sports, Helwan University, Faculty of Physical Education for Boys, Cairo (1994)
- 2- **Abul-Ela Ahmed Abdel-Fattah:** The Physiology of Training in Football - Dar Al-Fikr Al-Arabi, Cairo, (1994 AD)
- 3- **Ahmed Jalal Fahmy Badir:** Flexibility and morphology of the lower limb and its relationship to injuries among junior footballers, MA, (2014)
- 4- **Ahmed Attia Fakir:** Injuries of soccer players in the Republic of Yemen and ways to prevent them, an unpublished master's thesis, Cairo (2006).
- 5- **Ashraf El-Desouky Shaalan:** Injuries and First Aid, Turkish Edition, Tanta (2003)
- 6- **Ahmed Fathi Muslim Ibrahim:** The effect of a hospitalization physical program to reduce lower extremity injuries for soccer players, Master's thesis, Cairo, (2017)
- 7- **Tamer Abdel Razek Ibrahim:** Injuries caused by sand and hard court floors for practitioners in youth centers, a comparative study, MA (2007)
- 8- **Hossam Ahmed Darwish:** Classification of sports injuries in the various sports activities of infantry soldiers in the armed forces. And the reasons for their occurrence, unpublished master's thesis, (2003 AD).
- 9- **Hassan El-Sayed Abu Abdo:** Modern trends in planning and training football, what are they for printing and publishing, Alexandria (2013).
- 10- **Sherif El Adreni Hashem:** Analytical study of injuries related to technical performance among junior weightlifters, unpublished master's thesis, Cairo (2006 AD)
- 11- **Talha Hussein Hossam El-Din:** Biomechanics and Theoretical and Applied Foundations, Dar Al-Fikr Al-Arabi, Cairo, (1993)
- 12- **Talha Hossam El-Din:** The Scientific Encyclopedia of Training and Sports, The Scientific Group, Cairo (2000 AD)





- 13- **Taha Ismail, Ibrahim Shaalan, Amr Abul-Magd:** The Football Association, Al-Ahram Commercial Printing Press, Cairo (1993).
 - 14- **Abdel Tawab mourns Fouad:** The effect of artificial turf pitches on lower extremity injuries for junior football masters (2018)
 - 15- **Majed Abdullah Muhammad Mukhtar:** The relationship between the ability to focus attention and the accuracy of penalty kick performance for young footballers. Master's Thesis, College of Physical Education. Zagazig University (2004 AD)
 - 16- **Majed Majali and others:** An analytical study of sports injuries among soccer goalkeepers in Jordan An-Najah University Journal for Research Volume 24. (2010).
 - 17- **Muhammad Ali Abdel-Maboud:** Sports injuries among the junior handball, their causes and methods of prevention, an unpublished master's thesis, Cairo (2000 AD).
 - 18- **Muhammad Eid Ahmed Abu Hashem Al-Sarfi:** A preventive program to **reduce** lower limb injuries for kumite juniors in karate, Master's thesis, unpublished, Faculty of Physical Education, Tanta University, (2009)
 - 19- **Mohamed Qadri Bakri:** Traditional and oriental massage in alternative medicine, Cairo (2015)
 - 20- **Muhammad Kamal Al-Adly:** The effect of a suggested training program using competitive exercises on some physical abilities and some individual offensive plans for soccer juniors, unpublished Ph.D. thesis, College of Physical Education for Boys. Benha University (2019 AD)
 - 21- **Medhat Kassem Abdel Razek:** Sports Injuries and First Aid, Shajarat Al-Dur Library (2006 AD)
- Foreign references:**
- 22- **Arnold G.Nelson, et,al:** Stretching Anatomie: Der vollständig illustrierte Ratgeber für die anatomisch richtige Muskeldehnung und -kräftigung copress:auflage:2,durchgeseheneauflage.2009
 - 23- **Carlos Castagna Gran :** : Activity Profile of Young Soccer Players During Actual Match Play , journal of strength and conditioning research, vol.17,no.4,pp.775-78. 02003
 - 24- **Liu :** : The effect of developing the main skills on the performance level for some attacking individual planning principles for the soccer young players, Journal of Wuhan institute of physical education, Wuhan, P.R China.2002

