International Journal of Physical Education, Sports and Health 2023; 10(3): 33-36

P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (RJIF): 5.38
IJPESH 2023; 10(3): 33-36

www.kheljournal.com
Received: 25-02-2023
Accepted: 01-04-2023

Zirtluanga Chhangte
Research Scholar, Visva-Bharati University, Santiniketan, West Bengal, India

Sumanta Kumar Mondal
Professor, Department of Physical Education & Sport Science, Visva-Bharati University, Santiniketan, West Bengal, India

Corresponding Author:
Zirtluanga Chhangte
Research Scholar, Visva-Bharati University, Santiniketan, West Bengal, India

Effect of soccer push pass drill on ankle and knee joint angles of the players

Zirtluanga Chhangte and Sumanta Kumar Mondal

Abstract
The aim of this study was to examine the effects of ten week soccer push pass drill training on ankle angle and knee joints angle during push pass. A training programme was applied for ten weeks and composed of push pass drill training. There were two groups, Group-I was treated as the Experimental Group (n=10) and another group-II was treated as the Control Group (n=10). The experimental groups performed 10 weeks of push pass soccer drill training (three times per week) and the control group didn't go for any specific soccer drill training. All the subjects were selected adopting purposive random sampling technique. The players were evaluated in two moments, before training (pre-test) and after training (post test). The two-dimensional (Sagittal) high speed cameras were used to capture their performance. Motion Analysis software (Tracker 6.0.6 version) were used to analyze the data. The applied tests were ankle angle and knee angle at the time of ball contact. For statistical analysis IBM SPSS was used to determine descriptive analysis, and to detect significance of mean difference between experimental and control groups in ankle and knee joint angles. The result showed statistically no significant difference in ankle and knee joint angle after push pass soccer drill training.

Keywords: Soccer, push pass, ankle angle, knee angle, kinematic

1. Introduction
Soccer is the most popular sports all over the world (Lees and Nolan, 1998) [7]. One of the most important skills in soccer is the push-pass. The push pass represents the most basic pass in soccer. The player uses the inside of the foot to push the ball forward. The objective of passing is to move the ball quickly among teammates in order to keep it away from opponents and, ultimately in order to put the ball into a position for passing teammates or shoot on goal (CoachingAmericanSoccer.com). One of the main skills for a soccer player tobe developed is the push-pass, which must be producing both accurate and powerful passes and shot over a short and medium distance. To become perfect lots of repetitive practice is required.
There are many researchers and scholars whowere involved in studying kinematics and mechanical analysis associated with the soccer performance. However, a few literature review of push pass in soccer was found. There are several methods of passing technique in soccer, however passing the ball over a short distance with a high degree of accuracy; the push-pass is a preferred method. During the contact phase, the foot makes contact with the mid-section of the ball and thereby initiates movement of the ball towards intended target. This phase is characterized by an intense contraction of the muscles involve in bringing the outwardly rotated right foot and right leg forward to contact the ball (Nicolaas 1991) [5].
There are few studies regarding push-pass in soccer and measuring the angle of ankle and knee joints during ball contact to the foot. The knowledge of this kinematic study of contact phase ankle and knee angle of soccer push-pass would help the coach in their coaching programme and even the players to get knowledge to improve their performance.

2. Objectives of the study
The objectives of the study were to find out the effectiveness of specific soccer push pass drill in the ankleand knee joint angles of soccer players of push pass leg. The second objective was to find out the effectiveness of specific soccer push pass drill in the ankle and knee joint angle of non-push pass leg.

3. Methodology

In this study, the researcher selected a total of twenty boy's academy soccer players from Mizoram, India. The researcher selected two groups of participants Group-I was assigned as Experimental group (N=10) and another group-II was assigned as Control group (N=10). All the participants were selected from I-League Club in India i.e., Aizawl Football Club (AFC) Academy players, who were playing at State level and their age were ranging from 14-17 years. The subjects were all right footer. All the subjects were selected adopting purposive sampling technique.

3.1 Training Method

During the training, all the subjects were assembled with full soccer dress at the soccer field. They were briefed of training procedure. The investigator clarified the purpose of the study. They were told to perform soccer push pass. They were informed that during pre-test and post-test their action would be covered by video cameras. The soccer drill was demonstrated several times in front of the subjects to give them an idea of what they were supposed to perform. The experimental group received specific soccer push pass drill training whereas control group did not receive any treatment.

3.2 Duration of training period

The training programme of soccer push pass drill was conducted thrice in a week days i.e., Monday, Wednesday, Friday for a period of ten (10) weeks. In this training program, general principle of sports training was followed.

3.3 Data Measurement

The angle of ankle joints and knee joints of experimental and control groups were measured before training. Again, after ten weeks of experimental group's training, post test was conducted for both the groups to measure the angle of ankle and knee joints angle.

4. Biomechanical Set Up

4.1 Set up of a Camera

The two 120fps Nikon cameras were used to record the push pass activity, and their positioning is shown by a diagram that is appropriate for the right footer. During the execution, data were recorded by using a Nikon P-7000 video camera from the sagittal plane. Tracker 6.0.6 version of Motion Analysis software was used to examine the participants push passaction. Since the camera's frame rate was 120 frames per second, the interval between two frames was 1/120=0.0083 seconds. Cameras were placed at 3:00 meters from the box and lens height was fixed at 1.5 meters from the ground. During the execution, the position of the camera was fixed.

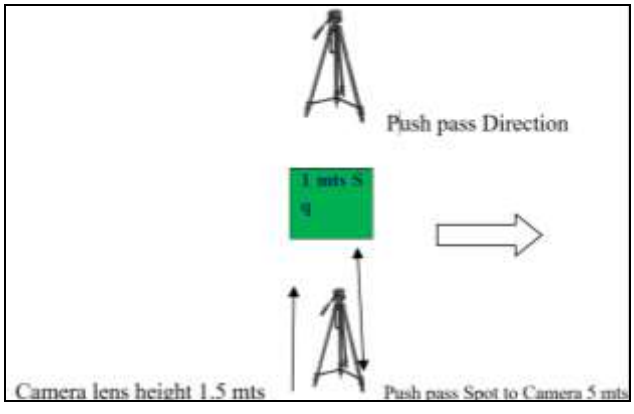

Illustration: Set up of Filming Procedure

4.2 Set up for the Experiment

In this experimental study, pre-test and post-test was conducted, those who received specific soccer push pass drill training were treated as the experimental group (n=10), whereas those who didn't receive any specific soccer push pass drill training were treated as the control group (n=10).

Table 1: Experimental Design

Experimental Group	Pre	T	Post
Control Group	Pre	-	Post

Pre = Pre-Test
T=Training
Post= Post-Test

4.3 Statistical Analysis

The kinematic variables such as ankle joint angle and knee joint angle were analyzed using descriptive statistics (mean, standard deviation) and Analysis of Covariance (ANCOVA) was employed to determine whether there had been any significant difference of means between experimental and control groups after 10 weeks of soccer push pass drill training. The level of significance was set at 0.05.

5. Result and Findings

The statistical analysis of data of experimental group and control group on selected variables for pre-test and post-test has been presented below:

Mean and standard deviation values of experimental and control groups' ankle and knee joints angles in push pass are presented in table- I.

Table 1: Descriptive Statistics of Experimental Group and Control Group on Push Pass

Variables		N	Experimental Group	Control Group
			Mean and standard Deviation	Mean and standard Deviation
Push pass Leg Ankle Joint Angle	Pre Test	10	88.50±2.12	98.50±4.90
	Post Test	10	99.40±8.46	97.60±3.97
Non-Push pass Leg Ankle Joint Angle	Pre Test	10	86.40±5.35	85.50±6.98
	Post Test	10	87.60±4.69	84.90±6.80
Push pass Leg Knee Joint Angle	Pre Test	10	159.00±1.76	145.20±1.87
	Post Test	10	144.60±1.57	135.40±1.83
Non-Push pass Leg Knee Joint Angle	Pre Test	10	162.80±1.87	160.30±2.00
	Post Test	10	156.90±1.66	154.90±1.19

Table 1 shows that pre test & post test mean & standard deviation values of ankle joint of push pass and non-push pass legs in experimental group are 88.50±2.12 & 99.40±8.46 and 86.40±5.35 & 87.60±4.69 degree respectively. Table-1 also shows pre test & post test mean & standard deviation values of knee joint of push pass and non-push pass legs in experimental group are 159.00±1.76 & 144.60±1.57 and 162.80±1.87 & 156.90±1.66 degree respectively. Further it is also evident from the Table-1 that the pre test & post test mean & standard deviation values of ankle joints of push pass and non-push pass legs of control group are 98.50±4.90 & 97.60±3.97 and 85.50±6.98 & 84.90±6.80 degree respectively, whereas knee joint angles are 145.20±1.87 & 135.40±1.83 and 160.30±2.00 & 154.90±1.19 degrees respectively.

Significance of mean difference between experimental and control groups in push pass leg ankle joint angles are presented in Table-2.

Table 2: ANCOVA Table for Push Pass Leg Ankle Joint Angle

Variables	Adjusted Paired Mean		Sum of Squares	df	Mean Square	F	Sig. Level (p-value)
	Experimental Group	Control Group					
Push Pass	102.668	94.332	117.984	1	117.984	2.963	0.103
			676.979	17	39.822		
*Significant at .05 level							

Table 2 reveals that there was no significant difference in the mean value of experimental and control groups in push pass leg ankle joint angle after undergoing the push pass drill training as obtained P-value 0.103 is greater than 0.05 level of significance.

Significance of mean difference between experimental and control groups in non-pushpass leg ankle joint angles are presented in Table-3.

Table 3: ANCOVA Table for Non-Push Pass Leg Ankle Joint Angle

Variables	Adjusted Paired Mean		Sum of Squares	df	Mean Square	F	Sig. Level (p-value)
	Experimental Group	Control Group					
Push Pass	87.213	85.287	18.446	1	18.446	3.127	0.095
			100.275	17	5.899		
*Significant at .05 level							

Table 3 reveals that there was no significant difference in the mean value of experimental and control groups in non-push pass leg ankle joint angle after undergoing the push pass drill training as obtained P-value 0.095 is greater than 0.05 level of significance.

Significance of mean difference between experimental and control groups in push pass leg knee joint angles are presented in Table-4.

Table 4: ANCOVA Table for Push Pass Leg Knee Joint Angle

Variables	Adjusted Paired Mean		Sum of Squares	df	Mean Square	F	Sig. Level (p-value)
	Experimental Group	Control Group					
Push Pass	143.188	136.812	11.970	1	11.970	4.045	0.060
			50.303	17	2.959		
*Significant at .05 level							

Table 4 reveals that there was no significant difference in the mean value of experimental and control groups in push pass leg knee joint angle after undergoing the push pass drill training as obtained P-value 0.060 is greater than 0.05 level of significance.

Significance of mean difference between experimental and control groups in non-push pass leg knee joint angles are presented in Table-5.

Table 5: ANCOVA Table for Non- Push Pass Leg Knee Joint Angle

Variables	Adjusted Paired Mean		Sum of Squares	df	Mean Square	F	Sig. Level (p-value)
	Experimental Group	Control Group					
Push Pass	156.640	155.160	7.486	1	7.486	3.650	0.073
			34.863	17	2.051		
*Significant at .05 level							

Table 5 reveals that there was no significant difference in the mean value of experimental and control groups in non-push pass leg knee joint angle after undergoing the push pass drill training as obtained P-value 0.073 is greater than 0.05 level of significance.

6. Discussion of Findings

There was no significant difference in push pass leg ankle angle between experimental and control group players. As force applied in push pass is not very high, only direction and location of application of force was mattered. Hence, no significant difference between experimental and control groups in push pass leg ankle angle was occurred.

There was no significant difference in non-push pass leg knee joint angle between experimental and control group players. As described earlier, players need not to put much effort in push pass for their accuracy. Effort in regard to muscular action leads to generation of force. Alteration in force generation is obtained by angular changes of the body segments. But as requirement of force in the present technique is not much, angular changes to develop mastery in push pass was not resulted.

7. Conclusion

1. In push pass, drill training is not effective for any angular changes in both the legs.
2. Push pass is a fundamental skill of soccer and space for further adaptation in that skill through drill training is very minimal.
3. Push pass drill training causes mechanically beneficial angular change in ankle position.

8. References

1. Levanon J, Dapena J. Comparison of the kinematic of the full instep and pass kick in soccer. Medicine and Science in Sports and Exercise. 1998;30(6):917-927. DOI: 10.1097/00005768-199806000-00022.
2. John C. Harves, CoachingAmericaSoccer.com, 2005.
3. Komarudin, Sugiharto, Hari Setijono, Setya Rahayu. Biomechanics Analysis of Passing Accuracy by Using Foot and Kick distance at the student football player. Advances in social Science, Education and Humanities Research (ASSEHR), volume 247. International Conference on Science and Education and Technology, 2018 (ISET 2018). DOI:10.2991/iset-18.2018.60.

4. Matteo Zago, Andrea Francesco Motta, Andrea Mapelli, Isabela Annoni, Christel Galvani, Chiarella. Effect of Leg Dominance on The Center-of –Mass Kinematics During an Inside-of –the-Foot Kick Amateur Soccer Players. Journal of Human Kinetics. 24 September 29:42:51-61. Published online 2014 Oct 10. Doi: 10.2478/hukin-2014-0060.
5. Nicolass Pronk P. National. Sports Performance Series: The Soccer Push-Pass. Strength and Conditioning Journal. 1991;13(2):6-9.
6. Pan Li. Biomechanical kinetics analysis of flexors and extensors on knee joint in soccer players. Applied Mechanics and Materials. 2014;540:313-316. Doi: 10.4028/www.scientific.net/AMM.540.313
7. Lees A, Nolan L. The biomechanics of soccer: a review. Journal of sports sciences. 1998 Jan 1;16(3):211-234.