THE EFFECTS OF A FOUR-WEEK BALANCE TRAINING PROGRAMME ON DYNAMIC BALANCE AND SOCCER SKILL PERFORMANCES

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2009

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude and my sincere thanks to my supervisor Puan Norlizah Abdul Hamid from the Faculty of Sports Science and Recreation, Universiti Teknologi MARA for her valuable comments and support throughout this study.

My special thanks go to my family especially my husband, siblings, nieces and nephews for their unconditional love and support throughout my journey in higher education. No words or material possessions can ever express my gratitude for all that you have done for me, for all that you are, and for being in my life.

I also would like to thank friends particularly Marlina Abdul Majid , relatives and loved ones for helping me get through this project You have been there for me and are a huge part of who I am and where I am today.

Furthermore, I would like to thank all of the staff, coaches and physical trainer of Perbadanan Kemajuan Negeri Selangor Football Academy to allow me completed this study. It is a wonderful feeling to know that you all took efforts to support this project in order to see me succeed. It has been a pleasure working with you throughout data collection and without your enthusiasm this study would not have been possible.

Last but not least, I would like to thanks to all lecturers in the Faculty of Sports Science and Recreation especially Dr.Wee Eng Hoe ,Mr. Borhan Yusuf, Cik Suhana Aiman and Encik Norasrudin Sulaiman that helped me in all aspects of this project from the initial steps of brainstorming, to conducting this study and then to putting it all on paper.

Thank you.

ABSTRACT

The Effects of a Four Week Balance Training Program on Dynamic Balance and **Soccer Skill Performances**

The purpose of this study was to investigate the effects of a four-week balance training programme on dynamic balance and soccer skill performances. Young soccer players from Perbadanan Kemajuan Negeri Selangor (PKNS) Football Academy (n= 30) were recruited in this study to evaluate the effects of balance training on them. The players were randomly divided into two groups (n =15 each), one control group and one experimental group. The experimental group followed a four-week balance training programme with 3 times per week, 20 minute per session. Johnson Modification Dynamic Bass Test of Dynamic Balance (JMBT) was used to assess dynamic balance ability and Loughborough Soccer Passing Test (LSPT) was used to assess soccer skill performances .A repeated measure ANOVA showed there was a significant differences at $p < 0.000$ in dynamic balance and soccer skill performances between the experimental and control groups. Paired sample t-tests indicated that there were statiscally significant improvements in experimental group on dynamic balance and soccer skill performances at $p < 0.001$ .No significant differences were found in the control group. In conclusion, balance training programme is an effective approach in soccer training to enhance player performances.

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LIST OF ABBREVIATIONS

PKNS.....Perbadanan Kemajuan Negeri Selangor

JMBT.....Johnson Modification of the Bass Test of Dynamic Balance

LSPT.....Loughborough Soccer Passing Test

EG.....Experimental group

CG.....Control Group

cm.....Centimeters

Kg.....kilogram

CHAPTER 1

INTRODUCTION

1.1 Introduction

The game of soccer is the world most popular team sport with millions participants and spectators around the globe. Known internationally as football, soccer is the major sport in Asia, Africa, Europe and South America. Due to its popularity and financially interest, it is also one of the most extensively research in team sports (Price, Neilson & Jones, 2004). Nevertheless, this is largely based on gathering match analysis data, physiological demands, equipment and training. Limited research suggests that dynamic balance is associated with soccer skills performances. Nearly all research done on dynamic balance and soccer focused on how balance may be used as tools for injury prevention, not in sport performance (Cumps, Verhagen & Meeusen, 2007).

The concept that an athlete's ability to perform different motor skills is determined by one general motor ability .Thus, a person with high general motor ability would tend to learn motor skills more quickly than a person with low general motor ability. Balance is often regarded as motor ability which referred to an ability that is specifically related to the performance of a motor skill. Therefore, the improvements of balance may influence in sport skills performance (Magill, 2006).

Basically, balance appeared in two distinct forms: static and dynamic. Static balance refers to the maintaining of equilibrium while in stationary position meanwhile dynamic balance maintaining equilibrium while in motion (Miller, 2006). In soccer, players usually performed a series of dynamic balance because movement in soccer is realized mostly

in unstable condition; therefore an enhancement of dynamic balance is beneficial for soccer athletes to master skills (Strand & Wilson, 1993).

Since soccer involves abrupt and intense changes in direction, as well as high frequencies of starting, stopping and physical contact, dynamic balance should be considered as one of the fundamental components of soccer, (Hobbs, 2008). Even though, dynamic balance is seemingly simple task, but it is actually a complex process involving coordination of multiple sensory, motor and biomechanical (Lucett, 2007).

Usually in performing soccer skills like dribbling, it involved motions of the ankle, knee and hip joints which are controlled by coordinated actions. This showed that dynamic balance is also associated with other motor ability such as multilimb coordination (Guskiewicz & Perrin, 1996). Maintaining dynamic balance is an advantage to retain a position and to voluntarily move, which are useful while performing soccer skills (Pafis, Ispirdilsis & Godolias, 2006).

Punakallio (2005) also agreed that balance is a complex component and describe it as the dynamics of body posture in preventing falling. This is particularly important in soccer because soccer players often performed lower extremity movements and this required a player to maintain equilibrium over time. Moreover, soccer players frequently perform single leg reaching movements outside their base of support during passing, receiving, passing, dribbling and shooting which may explain why dynamic balance in soccer player is important (Bressels, Yonker, Kras & Heath, 2007).

This component can be improved through specific balance exercise and training. Several studies proven that balance training in certain duration of times has significant effect on balance among athletes. Gioftsidou, Malliou, Pafis, Beneka, Godolias &

Maganaris (2006) stated that there were a changes in dynamic balance abilities among soccer players following a twelve-week balance training programme compared to a group that undergone a regular soccer training . In further support of this finding, study by Yaggie and Campbell (2006) also proven that dynamic balance in soccer player was better after a six-week training programme.

Increasing in the dynamic balance may influence several functions. Firstly, it will give impact on improvement on athlete sports skills and technique; secondly, on athletes sports performances. A study by Vladimir (2006) provides evidence that special dynamic balance training exercises had positive influences for sport performance. In this study differences in sport performance was observed before and after a balance training programme. He confirmed athletes in tennis and sailing achieved better national ranking in their participation 22 % more than before dynamic balance training was practiced.

Soccer players with poor balance are at disadvantage in efficiency of performing other soccer skills. Also these individuals are at greater risk to fall and injure themselves especially in the lower extremities (Pafis,Giofsitdou,Malliou,Beneka,Ipsirlidis &Godolias, 2005). Cumps et al. (2007) studied on the efficacy of a sports specific balance training programme on the incidence of ankle sprains in basketball. It was shown that balance training was the most promising preventative tool for ankle sprains.

Similarly, Hrysomallis (2007) revealed balance training reduce the recurrence and ankle ligament injuries and anterior cruciate ligaments among male soccer players. For that reason, it is essential to know the balance ability of soccer players therefore it may help them to train effectively and as competition preparation to achieve better sports result with minimize the risk of injuries. In addition, performance of any other skills requires some degree of balance, for instance in speed and agility. When athletes have better

agility, the easier it is to balance their movements. This showed that agility and balance is affecting one another (Daphne, 2005).

Since balance can be improved, balance tests should be used to identify players who are weak in balance. Dynamic balance can be measured either using laboratory test or field test. Numerous techniques have been described to measure balance and both of test varying levels of challenge in different populations. Laboratory test like stabilometry usually is costly, highly technical, required training to handle the equipments and often not portable (Emery, Cassidy, Klassen, Rosychuk & Rowe, 2005). Field test is more practical, besides inexpensive it also easy to administer and no equipment is needed to conduct the test .However as balance is specific to a body parts and may be specific to a sport activity , different types of balance tests should be use for diagnostic purposes (Miller, 2006).

Furthermore, to assess the effects of improvement of dynamic balance on the soccer sports skills, the soccer skill test should be on dynamic state. Although there are soccer skill tests that are popular and widely used, most of the test was actually assessing technique rather than skill. Also, some of the tests were taken in the static position and it can therefore be argued that the test does not assessing soccer skills in dynamic state (AN, Williams , Hulse , Strudwick , Reddin , Howarth , Eldred , Hirst & McGregor, 2007).

As a conclusion, dynamic balance can be used to predict future performances, indicate weaknesses and as an indicator of improvements. A soccer skills test in dynamic state were used to asses either application of balance training may enhance the improvements in soccer skills.

1.2 Statement of Problem

Nearly all movements in soccer skills required the players to perform in dynamic state. Most of the studies found in dynamic balance were more on balance as preventative tools of sport injuries. No study found that dynamic balance is significant to soccer skills performances. Moreover, there is no literature references or research reports were found that provide any evidence on how dynamic balance effects on soccer skill performances in Malaysia. Therefore, the aim of this present study was to examine the effects of four-week balance training programme on dynamic balance and soccer skill performances.

The rationale for the present study is to look on the effectiveness of special balance training programme in improving soccer skill ability. More specifically, this study focused:

i. to examine the effects of balance training in improving dynamic balance among soccer players after four-week programme.

ii. to examine the improvements in soccer skill ability after implementation of the four-week balance training programme.

1.3 Purpose of the Study

The purposes of this study are as follows:

Primary purpose:

i. to test the effectiveness of a four-week balance training programme on dynamic balance among soccer players

ii. to look on the effectiveness of balance training programme on the improvements of soccer skill ability among soccer players .

iii. to look on the differences between soccer players who trained regular soccer training with balance training and a soccer players who trained only on regular soccer training.

Secondary purposes:

iv. as a basis of recommendation to include specific balance training programme to enhance the performances among soccer players .

1.4 Research Hypothesis

This study was primarily concerned with the investigation on the effects of special balance training programme on dynamic balance and soccer skill ability The study focused on the following hypothesis which is expressed in the null form:

i. There is no significant difference in dynamic balance between experimental and control group of soccer players.
ii. There is no significant difference in soccer skill performances between experimental and control group of soccer players.
iii. There is no significant difference in dynamic balance between pre and post test among experimental group.
iv. There is no significant difference in soccer skill performances between pre and post test among experimental group.
v. There is no significant difference in dynamic balance between pre and post test among control group.
vi. There is no significant difference in soccer skill performances between pre and post test among control group.

1.5 Significance of the Study

This study was apparently the first attempt to study the effects of special balance training on dynamic balance and soccer skill ability. There is a need to increase understanding on how dynamic balance is an important component in soccer. First and foremost, this study is used to establish that balance is an important component in soccer training and proved that balance exercises is beneficial to enhance dynamic balance, which is important for the advancement of overall soccer skill ability. Most importantly, this study can be used to show the effectiveness of balance training programme on dynamic balance and soccer skill performances. This study would be necessary to contribute information on the effect of balance training to soccer skill performances, serve as data on balance training as related to soccer performances. Last but not least, it is used to provide knowledge to soccer coaches and players about the important of balance training in soccer skill performances and as a reference for future research on balance training programme, dynamic balance and soccer skill performances.

1.6 Delimitations of the Study

The following delimitations were placed on this study:

i. The study was delimited to thirty male soccer players only, aged from 15 to 18 years old who were free from any musculoskeletal injuries.

ii. The subjects were randomly assigned to two groups as follow: one control group and one experimental group.

iii. Subjects were healthy as assessed by Pre-exercise Testing Health Status Questionnaire

iv. Only field players were involved in this study.

v. Only dynamic balance and soccer skill were tested.

vi. The Johnson Modification of the Bass Test of Dynamic Balance (JMBT) was used to measure the dynamic balance in pre and post of the studies. All measurements were performed by the investigator and the research assistants.

vii. The Loughborough Soccer Passing Test (LSPT) was used to measure the effectiveness of dynamic balance in soccer skill ability in pre and post of the studies. All measurements were performed by the investigator and the research assistants,

viii. Only male soccer players who had no other balance training activity prior to and during the entire research period are allowed to participate in this study.

ix. The study was conducted for a period of four weeks between 13th July to 9th August 2009

x. Experimental group trained three times per week and 20 minutes per session and supervised by physical trainer of the football academy.

1.7 Operational Definition

To avoid differentiations, given below are some operational definitions as they are used in this study.

i. Balance: Balance is defined as the ability to sustain or return the body's center of gravity over its base of support (Emery et a'.,2005). Operationally, it is the ability of a soccer player to maintain a stable condition in performing soccer skills without falling

ii. Balance training: Defined as the ability to recover balance or base of support (BOS) from postural sway (body movement over BOS) following a destabilizing stimulus caused by objects, self-motion or the environment (Lucett, 2007). Operationally in this study it defined as the exercise that may help in improving dynamic balance and soccer skill ability,

iii. Dynamic Balance: Dynamic balance is defined as maintaining the equilibrium while in motion (Magill, 2006). Operationally dynamic balance in this study is the ability of a soccer player to maintain a stable condition and control movement while dribbling, running and jumping,

iv. The Johnson Modification of the Bass Test of Dynamic Balance (JMBT): A test, which has the subject to maintain balance during movement and upon landing from a leap in 10 directions (Miller, 2006). Operationally it is test to measure dynamic balance ability in soccer players,

v. Loughborough Soccer Passing Test (LSPT): A test to measure soccer skills (Ali.et al., 2007). Operationally Loughborough Soccer Passing Test is used to measure the improvements on soccer skills ability or performances after completed balance training.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The game of soccer is possibly the most popular team sport in the world, with over 200 million active players and a television audience peaking at 1.7 million for the final of the FIFA (The Federation International de Football Association) 2002 World Cup Championships. One of the reasons for the global popularity of soccer is its simplicity and uncomplicated equipments requirements (Price et al., 2004). Because of the popularity of the games, there are numbers of studies done on soccer including balance. However, previous studies on balance are more concerned on the effects of balance training programme for soccer injury prevention (Pafis et al., 2006). The aim of this study was to investigate the effects of balance training programme on dynamic balance and it association with soccer skill performances.

2.2 Soccer

Soccer is officially the most popular sport in the world. The Federation International Football Association (FIFA) estimated that there are 250 million licensed players in 204 countries with 1% participation at professional level. Soccer is definitely a major global sport attracting participants and viewers from all continents. It is the national sport of most European and Latin-American countries, and of many other nations including Malaysia (Chang, Kapasi, Daisley & Leach, 2001).

The basic concept of soccer is very simple. There are two teams (each with 11 players) and each team must advance the ball down the field and score it in their opponent's goal without using their hands or arms. The team with the most points at the end of regulation wins the game. Overall, the sport has progressed a long way. Players just keep getting better and better as the intensity of the sport just gets greater and greater. And although the concept of this sport is very simple there is so much technique and skill involved in the playing of the sport. It's definitely a sport in which need a lot of practice to be competitive (Ali et al., 2007).

Dribbling, passing and shielding are the essential skills used for maintaining possession of the ball. Dribbling skills enabled player to run past opponents and to advance the ball at speed when moving in open space. Shielding skills are used in conjunction with dribbling skills to protect the ball from opponents attempting to steal it meanwhile passing is warranted to ensure the ball is secured to bring forward to the opponent area (Luxbacher, 2005).

Success in soccer is depending on variety of factors including the physical characteristics and physiological characteristics. Each game involves changes of activity by individuals and required players to perform the changes in the course of play. Therefore it is important to know the ability of players especially in performing basic skills like kicking, passing, trapping, dribbling, tackling and heading. Analysis of physical characteristics of players and determination of the specific requirements for optimal performance is a necessity (Daphne, 2005).

Studies on soccer grew as the sport itself. During the last two decades, there has been significant accumulation of scientific data regarding soccer physiology and medicine (McIntyre, 2004. and Bunc & Psotta, 2001). Aspects such as experience, body composition, endurance, balance between anaerobic power and aerobic are primary importance in evaluation of soccer player (Ostojic, 2003). Moreover, studies done on soccer usually are to improve on the games equipment and soccer player abilities through recommended training such as plyometrics, speed, agility, quickness and strength (Price et al.2004).

Because of the popularity and financial interest, soccer is the most extensively research on team sports (Ali et al., 2007). Even though the popularity of the games is increasing, apparently, there are no study on application of specific balance training towards soccer skill performance The significance of dynamic balance and soccer skill was always overlooked although most of the skills in soccer are performed in a dynamic balance form and even during the assessment on most of the soccer sports skill. For that reason, more research on dynamic balance should be explored to find the significant of this component towards soccer player ability and performances.

2.3 Soccer Skill Assessment

There are numbers of soccer skill test, for instance, a Mor-Christian General Soccer Ability Skills Test Battery (1979), Johnson Soccer Test (1963), Yeagley Soccer Test (1972) and McDonald Soccer Test (1951). The skill that has usually been assessed is dribbling, passing, kicking, trapping, heading, goalkeeping and throwing (Strand, & Wilson, 1993). The result of the test may be used to determine either dynamic balance has significant influences on soccer skill or it also may be used to determine level of achievement and also to predict performances, comparative evaluation and also diagnosis performances.

McDonald soccer test is used to measure general soccer ability. This test is simple to perform where the test performer should kick the ball against the wall as many times possible for 30 seconds. This test is more suitable for high school or college age and not optional for high level athletes. Lacy and Hastad (2007) suggested a few soccer tests to measure soccer skills in soccer players. The most widely used is the soccer battery test that included four types of soccer skills: dribbling, juggling, heading and wall volley. This test is able to measure the soccer skills and has validity of .78 and reliability coefficients .64 to .91 .Nevertheless, Ali et al. (2007) claimed that one of the skills (heading) is taken more on static position and it can therefore not suitable to measure the effects of dynamic balance on soccer skill. Moreover, he claimed that the test was actually assessing more on technique rather than skill. In addition, for shooting assessment (wall volley) ,there was no information on the speed of each shot and so players could have kicked the ball at speeds less than in those in match play to achieve greater accuracy. Although there are soccer skill test that are popular with coaching organizations, these have yet to be validated and so have limited use as research tools.