

**“A COMPARATIVE STUDY TO ANALYZE THE EFFICACY OF  
CONTRAST TRAINING PROGRAMME AND SPEED AGILITY  
QUICKNESS TRAINING ON AGILITY PERFORMANCE OF ELITE  
MALE FOOTBALL PLAYERS”**

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**CERTIFICATE**

The work embodied in the thesis entitled **A COMPARATIVE STUDY TO ANALYZE THE EFFICACY OF CONTRAST TRAINING PROGRAMME AND SPEED AGILITY QUICKNESS TRAINING ON AGILITY PERFORMANCE OF ELITE MALE FOOTBALL PLAYERS** submitted to THE TAMIL NADU DR. M.G.R MEDICAL UNIVERSITY, Chennai-32 in the partial fulfilment of the requirement for the degree of Master Of Physiotherapy(SPORTS Physiotherapy) was carried out by candidate bearing register number **271750123** at Cherran's College Of Physiotherapy, Coimbatore under my supervision. This is an original work in part or full for any other degree/diploma at this or any other university/Institute. This thesis is fit to be considered at this or any other university/Institute. This thesis is fit to be considered for evaluation of Master of Physiotherapy.

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## **DECLARATION**

The work embodied in this project entitled **“A COMPARATIVE STUDY TO ANALYZE THE EFFICACY OF CONTRAST TRAINING PROGRAMME AND SPEED AGILITY QUICKNESS TRAINING ON AGILITY PERFORMANCE OF ELITE MALE FOOTBALL PLAYERS**, was the original work carried out by me and has not been submitted in part or full for any other degree/diploma at this or any other institute/university. All the ideas and references have been duly acknowledged

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## **ABSTRACT**

### **A COMPARATIVE STUDY TO ANALYZE THE EFFICACY OF CONTRAST TRAINING PROGRAMME AND SPEED AGILITY QUICKNESS TRAINING ON AGILITY PERFORMANCE OF ELITE MALE FOOTBALL PLAYERS**

**BACKGROUND:** Football is a sport requiring high-intensity, intermittent, non-continuous exercise that includes agility, many sprints of different durations, rapid acceleration and jumping, among others. During the game players perform repeated bouts of low level activity such as walking, jogging or cruising in conjunction with high-intensity actions such as sprinting, jumping and directional changes. Agility has been indeed defined as a rapid whole-body movement with change of velocity or direction in response to a stimulus. To compare the effectiveness of change of direction drills with agility training versus speed agility quickness training on agility among elite male football players.

**METHODOLOGY:** A comparative study with pre and post test evaluation. 30 Subjects aged under 19 years were divided into two groups, received contrast training (n1=15) and speed agility quickness training (n2=15). Initially the participants were screened based on the inclusion and exclusion criteria and also tested with Illinois agility test. Then the players underwent contrast training and speed agility quickness programme.

**RESULT:** The study concluded that both the groups significantly improved agility among the elite male football players, but speed agility and quickness programme improved agility efficiently than the contrast training.

**CONCLUSION:** The study concluded that both the groups significantly improved agility but Speed agility quickness improved agility efficiently than the contrast training.

**KEYWORDS:** Aerobic; Anaerobic; Change of direction; Drills; Endurance; Flexibility; Muscle strength.

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# *INTRODUCTION*

# CHAPTER I

## INTRODUCTION

Success in soccer requires high levels of technical, tactical, psychological and physical skills including aerobic and anaerobic power, muscle strength, flexibility and agility (Chamari K et al., 2004).

During a soccer game, players perform repeated bouts of low-level activity such as walking, jogging or cruising in conjunction with high-intensity actions such as sprinting, jumping and directional changes (Rouissi M et al., 2016).

The ability to sprint, accelerate and decelerate alongside change of direction is commonly known as agility. Agility has been, indeed, defined as a rapid whole-body movement with change of velocity or direction in response to a “stimulus” (Sheppard JM et al., 2006). Referring to the model proposed by Young et al. (Markovic G et al., 2007).

Change of Direction speed is influenced by several factors such as straight sprint (SS), leg muscle qualities (i.e. strength, power and reactive strength) and running technique. Therefore, in order to improve COD ability, many studies have proposed training programme with planned activities (closed skills) based on the development of these determinants factors.

In the last decades, the scientific literature has shown controversial findings in that regard. Indeed, some studies revealed that SS-based training enhanced COD performance (Polman et al., 2004).

Agility has been defined as the ability to maintain a controlled body position and rapidly change direction without a loss of balance, body control, or speed (Roosen et al., 2008).

The components of agility have been defined as balance, coordination, power, and speed (Angeli C et al., 2006).

It is essential for elite, recreational, and “tactical” athletes who require the ability to rapidly change directions in all planes for sport or work. Benefits from improved agility

include increased body control during fast movements, increased intramuscular coordination, and decreased risk of injury or reinjures (Pauole et al., 2000).

Soccer is a sport requiring high-intensity, intermittent, noncontinuous exercise that includes agility, many sprints of different durations, rapid accelerations and jumping, among others(Little et al., 2006).

High speed agility contributes to about 11% of the total distance covered during a game, which determines to winning possession of the ball and to scoring of goals in soccer(Reilly et al.,2000).Preparation for agility and other performance training should involve both long- and short-term preparations. Long-term preparation may include a well-developed agility training program, while short-term preparation should include a warm-up(Behm et al.,2000).

Today, soccer is a highly demanding game in which the participants are subjected to numerous actions that require overall strength and power production, speed, agility, balance, stability, flexibility and the adequate level of endurance(Bloomfield et al.,2007), thus making the conditioning of players a complex process.

One of the goals is to minimize the unknown variables to the least possible number. Recently, acceleration, speed, and agility have been found to be independent, unrelated qualities that produce a limited transfer to each other(Little et al.,2005).

The next step is to investigate methods that produce the integral effects that can be used in the Conditioning of soccer players. But, we found that few studies have investigated the training methods that produce the integral effects on various abilities. Within the context of randomized intermittent, dynamic and skilled movement type sports (randomized intermittent, dynamic type sports [RIDS]).

The SAQ training method more frequently uses the programmed than random type conditioning after the SAQ continuum. One SAQ session is composed of 7 components, where the main part of the session, explosion and expression of potential, are combinations of programmed and random conditioning. Integral planning and programming is

required to progress from fundamental movement patterns to highly positional specific movements (Yap et al.,2000).

A logical sequence in the learning process must not be neglected because it develops neural structures that are a prerequisite for elite-level upgrade. Consequently, elite players manipulate with their bodies without the loss of speed, balance, strength, and control. Also, with correct movement patterns (technique) and greater muscle power, they accelerate faster. Some studies (Baker et al., 2008) found that leg muscle power is a poor predictor of agility performance that emphasizes even more the integral influence within the vast range of capabilities. Agility is very important when it comes to soccer players (Robinson et al., 2004). Not only do they use it to outmaneuver the opposition but it also helps in preventing injuries. Optimal activation and inhibition of muscle fibers can prevent muscle tears and even more prevent the joints from injuries.

Jullien et al.(Jullien et al.,2008) stress that short-term agility training of not more than a 3-week duration can improve values in agility tests in soccer players. Also, it is important to notice that agility training forms a long-lasting response from motor memory. Pearson mentions 4 elements of agility such as balance, coordination, programmed and random agility all of which are used on the SAQ continuum with appropriate volume and intensity with regard to athletes' age and level of motor readiness. Research concerning the impact of strength training in the performance of different sport skill have been showing both increases(Fatouros et al.,2000) and decreases(Duthie et al.,2002) in performance. At this propose, Cometti(Cometti et al.,1999) states that strength training programs must assure transference between the acquired strength and the main technical skills and presents specific guidelines for strength training based on complex and contrast training (CCT).

## **1.2 NEED OF THE STUDY:**

Football is a sport requiring high-intensity, intermittent, non-continuous exercise that includes agility, many sprints of different durations, rapid acceleration and jumping, among others. During the game players perform repeated bouts of low level activity such as walking, jogging or cruising in conjunction with high-intensity actions such as sprinting, jumping and directional changes. There are two different protocol were followed for improvement of agility they are contrast training and speed agility quickness both of them would provide great result in agility.

Today, soccer is a highly demanding game in which the participants are subjected to numerous actions that require overall strength and power production, speed, agility, balance, stability, flexibility and the adequate level of endurance(Bloomfield et al.,2007), thus making the conditioning of players a complex process.

Soccer is a sport requiring high-intensity, intermittent, noncontinuous exercise that includes agility, many sprints of different durations, rapid accelerations and jumping, among others(Little et al., 2006).

Agility is very important when it comes to soccer players (Robinson et al., 2004). Not only do they use it to outmaneuver the opposition but it also helps in preventing injuries. Optimal activation and inhibition of muscle fibers can prevent muscle tears and even more prevent the joints from injuries. Since football player need agility skill to pass the ball between the players. There are many other protocols were followed but there was lack of evidence comparing two protocols (contrast training and speed agility quickness).

So my need of the study to compare the effectiveness of contrast training and speed agility quickness on improving agility among football player.

### **1.3 AIM OF THE STUDY:**

- To compare the effectiveness contrast training and speed agility quickness training on improving agility among elite male football players.

### **1.4 OBJECTIVE OF THE STUDY:**

- To find out the effectiveness of contrast training on improving agility among elite soccer player.
- To find out the effectiveness of speed agility quickness on improving agility among elite male soccer player.
- To compare the effectiveness of contrast training and speed agility quickness on improving agility among elite male soccer player.

## **1.5 HYPOTHESIS**

**The following hypothesis is framed for this study.**

### **NULL HYPOTHESIS:**

- There was no significant improvement on agility among elite male football player who receive contrast training.
- There was no significant improvement on agility among elite male football player who receive speed agility quickness.
- There was no significant difference between speed agility quickness and contrast training on agility among male elite football player.

### **ALTERNATIVE HYPOTHESIS:**

- There was significant improvement on agility among elite male football player who receive contrast training.
- There was significant improvement on agility among elite male football player who receive speed agility quickness.
- There was significant difference between speed agility quickness and contrast training on agility among male elite football player.



## **1.6 OPERATIONAL DEFINITION:**

### **SPEED AGILITY QUICKNESS:**

Speed agility quickness training method consolidates speed, agility and quickness through the range of soccer specialized exercise. All exercises are performed with optimal biomechanical movement structures, and consequently, energy and time saving are made. Power performance aside from major abilities has the need for optimal joint, dynamic balance, appropriate locomotor system and energy production from others.

### **CONTRAST TRAINING:**

Contrast training consists in use of high and low load in same strength training session. The loads used in contrast training can engage different regimens of contractions.

### **AGILITY:**

The ability to sprint, accelerate and decelerate alongside change of direction is commonly known as agility.

Agility has been defined as the ability to maintain a controlled body position and rapidly change direction without a loss of balance, body control, or speed.

### **ILLINOIS AGILITY TEST:**

The illinois agility test is a fitness test designed to test one sports agility

*REVIEW OF  
LITERATURE*

## **CHAPTER - II**

### **REVIEW OF LITERATURE:**

**SECTION A: STUDIES RELATED TO CONTRAST TRAINING ON IMPROVING AGILITY**

**SECTION B: STUDIES RELATED TO SPEED AGILITY QUICKNESS ON IMPROVING AGILITY**

**SECTION C: STUDIES REALTED TO ILLINOIS AGILITY TEST**

## SECTION A

### STUDIES RELATED TO CONTRAST TRAINING ON IMPROVING AGILITY

#### ❖ JOSE, et al.,(2010):

The purpose of this study was to analyze the short-term effects of complex and contrast training (CCT) on vertical jump (squat and countermovement jump), sprint (5 and 15 m), and agility (505 Agility Test) abilities in soccer players. Twenty-three young elite Portuguese soccer players (age 17.46±0.6 years) were divided into 2 experimental groups (G1,n= 9, and G2,n= 8) and 1 control group (G3,n= 6). Groups G1 and G2 have done their regular soccer training along with a 6-week strength training program of CCT,with 1 and 2 training sessions wk, respectively. G3 has been kept to their regular soccer training program. Each training session from the CCT program was organized in 3 stations in which a general exercise, a multiform exercise, and a specific exercise were performed. The load was increased by 5% from 1repetition maximum each 2 weeks. Obtained results allowed identifying (a) a reduction in sprint times over 5 and 15 m (9.2and 6.2% for G1 and 7.0 and 3.1%, for G2; p, 0.05) and (2) an increase on squat and jump (12.6% for G1 and 9.6% for G2; p, 0.05). The results suggested that the CCT induced the performance increase in 5 and 15 m sprint and in squat jump. Vertical jump and sprint performances after CCT program were not influenced by the number of CCT sessions per week (1 or 2sessionswk<sup>21</sup>). From the obtained results, it was suggested that the CCT is an adequate training strategy to develop soccer players' muscle power and speed.

#### ❖ FELIPE GARCI'A-PINILLOS, et al.,(2014):

The purpose of this study was to determine the effects of a 12-week contrast training (CT) program (isometric + plyometric), with no external loads, on the vertical jump, kicking speed, sprinting, and agility skills of young soccer players. Thirty young soccer players (age, 15.9 ± 1.43 years; weight, 65.4 ± 10.84 kg; height, 171.0 ± 0.06 cm) were randomized in a control group (n = 13) and an experimental group (n = 17). The CT program was included in the experimental group's training sessions, who undertook it

twice a week as a part of their usual weekly training regime. This program included 3 exercises: 1 isometric and 2 plyometric, without external loads. These exercises progressed in volume throughout the training program. Performance in countermovement jump (CMJ), Balsom agility test (BAT), 5-, 10-, 20-, and 30-m sprint, and soccer kick were assessed before and after the training program. A 2-factor (group and time) analysis of variance revealed significant improvements ( $p$ , 0.001) in CMJ, BAT, and kicking speed in the experimental group players. Control group remained unchanged in these variables. Both groups significantly reduced sprint times over 5, 10, 20, and 30 m ( $p$  # 0.05). A significant correlation ( $r = 0.492$ ,  $p$ , 0.001) was revealed between DBAT and Daverage kicking speed. Results suggest that a specific CT program without external loads is effective for improving soccer-specific skills such as vertical jump, sprint, agility, and kicking speed in young soccer players.

❖ **HUGUES JULLIEN,et al., (2008):**

The present study assessed the effects of specific leg strength training (as part of a broader exercise program) on running speed and agility in young professional soccer players. Twentysix male players (ages 17 to 19 years) were divided into 3 groups. The reference group (Re) performed individual technical work only, the coordination group (Co) performed a circuit designed to promote agility, coordination, and balance control (together with some technical work) and the Squat group (Sq) underwent 3 series of 3 squat repetitions (at 90% of the individual maximum value) and a sprint, before competition of the agility circuit and some technical work. These specific training programs were performed 5 times a week for 3 weeks. Before the experimental session and at the end of each week, all players were assessed using 4 types of tests, (agility, a shuttle test with changes of direction, and 2 sprints over 10 and 7.32 meters, respectively), with completion time being the only performance parameter recorded. Our results indicate that in the short sprints or shuttle sprint with changes in direction, lower limb strengthening did not improve performance. Performance improved in all 3 groups in the agility test but more so in the reference and coordination groups.

❖ **Derrick E. Speirs, et al (2016)**

The purpose of this study was to investigate the effects of a 5-week lower-limb unilateral or bilateral strength program on measures of strength, sprinting, and change of direction speed. Eighteen academy rugby players (18.1  $\pm$  0.5 years, 97.4  $\pm$  11.3 kg, 183.7  $\pm$  11.3 cm) were randomly assigned to either a unilateral (UNI) or bilateral (BI) group. The UNI group squatted exclusively with the rear elevated split squat (RESS), whereas the BI group trained only with the bilateral back squat (BS). Both groups trained at a relative percentage of the respective 1 repetition maximum (1RM) twice weekly over a 5-week period. Subjects were assessed at baseline and post intervention for 1RM BS, 1RM RESS, 10-m sprint, 40-m sprint, and pro-agility. There was a significant main effect of time for 1RM BS ( $F_{1,16} = 86.5$ ,  $p < 0.001$ ), ES (0.84, Cohen  $d = 0.92$ ), 1RM RESS ( $F_{1,16} = 133.0$ ,  $p < 0.001$ ), ES (0.89, Cohen  $d = 0.94$ ), 40-m sprint ( $F_{1,16} = 14.4$ ,  $p = 0.002$ ), ES (0.47, Cohen  $d = 0.67$ ) and pro-agility ( $F_{1,16} = 55.9$ ,  $p < 0.001$ ), ES (0.77, Cohen  $d = 0.89$ ), but not 10-m sprints ( $F_{1,16} = 2.69$ ,  $p = 0.121$ ), ES (0.14, Cohen  $d = 0.38$ ). No significant interactions between group and time were observed for any of the dependent variables. This is the first study to suggest that BI and UNI training interventions may be equally efficacious in improving measures of lower-body strength, 40-m speed, and change of direction in academy level rugby players

❖ **Tania Spiteri, et al (2014):**

Research has often examined the relationship between 1 or 2 measures of strength and change of direction (COD) ability reporting inconsistent relationships to performance. These inconsistencies may be the result of the strength assessment used and the assumption that 1 measure of strength can represent all “types” of strength required during a COD task. Therefore the purpose of this study was to determine the relationship between several lower-body strength and power measures, COD, and agility performance. Twelve ( $n = 12$ ) elite female basketball athletes completed a maximal dynamic back squat, isometric midhigh pull, eccentric and concentric only back squat, and a countermovement jump, followed by 2 COD tests (505 and T-test) and a reactive agility test. Pearson product-moment correlation and stepwise regression analysis were performed on all variables. The percentage contribution of each strength measure to an athletes total strength score was also determined. Our results demonstrated that both

COD tests were significantly correlated to maximal dynamic, isometric, concentric, and eccentric strength ( $r = 0.79$  to  $0.89$ ), with eccentric strength identified as the sole predictor of COD performance. Agility performance did not correlate with any measure of strength ( $r = 0.08$  to  $0.36$ ), whereas lower-body power demonstrated no correlation to either agility or COD performance ( $r = 0.19$  to  $0.46$ ). These findings demonstrate the importance of multiple strength components for COD ability, highlighting eccentric strength as a deterministic factor of COD performance.

❖ **MEHREZ HAMMAMI, et al., (2018):**

A study on effect of contrast strength and plyometric training on lower limb explosive performance, ability to change direction and neuro muscular adaptation in soccer players. The aim was to compare the effect of two different 8 weeks contrast training and plyometric training on change of direction and counter movement jump, leg peak power on a cycle ergometer. 40 soccer players were taken for study age 15, BMI 58.8 were divided into two groups. The result EMG parameter shows significant increase in both groups. The improvement of physical performance was better with 8 weeks of CST than with PT. They conclude that contrast training can be used as a effective method on improving ability to change direction among soccer players.

❖ **J STRENGTH, et al.,(2017):**

Studies on effect of standard strength vs contrast strength training on development of sprint ability and jump junior soccer players. The players were divided into two groups. ST  $n=16$  and CST  $n=16$  age 16.0. The intervention are 5 meters sprint 9-3-6-3-9m sprint 180degree turn with backward and forward running repeated shuttle sprint ability squat and counter movement jump. They RCOD parameters show significant improvement SG and CG. They conclude that during the comparative session some measures of athletic performance in male soccer player were increased in CT group.

## SECTION B

### STUDIES RELATED TO SPEED AGILITY QUICKNESS ON IMPROVING AGILITY

❖ **MARIOJOVANOVIC, et al.,(2011):**

The purpose of this study was to evaluate the effects of the speed, agility, quickness (SAQ) training method on power performance in soccer players. Soccer players were assigned randomly to 2 groups: experimental group (EG; n = 50) and control group (n = 50). Power performance was assessed by a test of quickness—the 5-m sprint, a test of acceleration—the 10-m sprint, tests of maximal speed—the 20- and the 30-m sprint along with Bosco jump tests—squat jump, countermovement jump (CMJ), maximalCMJ, and continuous jumps performed with legs extended. The initial testing procedure took place at the beginning of the in-season period. The 8-week specific SAQ training program was implemented after which final testing took place. The results of the 2-way analysis of variance indicated that the Improved significantly ( $p < 0.05$ ) in 5-m (1.43 vs. 1.39seconds) and in 10-m (2.15 vs. 2.07 seconds) sprints, and they also improved their jumping performance in countermovement(44.04 vs. 4.48 cm) and continuous jumps (41.08 vs. 41.39cm) performed with legs extended ( $p < 0.05$ ). The SAQ training program appears to be an effective way of improving some segments of power performance in young soccer players during the in-season period. Soccer coaches could use this information in the process of planning in-season training. Without proper planning of the SAQ training, soccer players will most likely be confronted with decrease in power performance during in-season period.

❖ **Zoran Milanović, et al (2013):**

The purpose of this study was to determine the effects of a 12 week conditioning programme involving speed, agility and quickness (SAQ) training and its effect on agility performance in young soccer players. Soccer players were randomly assigned to two groups: experimental group (EG; n = 66, body mass:  $71.3 \pm 5.9$  kg; body height:  $1.77 \pm 0.07$  m) and control group (CG; n = 66, body mass:  $70.6 \pm 4.9$  kg; body height:  $1.76 \pm 0.06$  m). Agility performance was assessed using field tests: Slalom; Slalom with ball; Sprint with 90° turns; Sprint with 90° turns with ball; Sprint with 180° turns; Sprint with backward and forward running; Sprint 4 x 5 m. Statistically significant improvements ( $p$



< 0.05) between pre and post training were evident for almost all measures of agility, with and without the ball, with the exception being the Sprint with backward and forward running. This suggests that SAQ training is an effective way of improving agility, with and without the ball, for young soccer players and can be included in physical conditioning programmes.

❖ **K Azmi, et al (2018):**

. This study aimed to analyze the effect of speed, agility and quickness training program to increase in speed, agility and acceleration. This study was conducted at 26 soccer players and divided into 2 groups with 13 players each group. Group 1 was given SAQ training program, and Group 2 conventional training program for 8 weeks. This study used a quantitative approach with quasi-experimental method. The design of this study used a matching-only design. Data was collected by testing 30-meter sprint (speed), agility t-test (agility), and run 10 meters (acceleration) during the pretest and posttest. Furthermore, the data was analyzed using paired sample t-test and independent t-test. The results showed: that there was a significant effect of speed, agility and quickness training program in improving in speed, agility and acceleration. In summary, it can be concluded that the speed, agility and quickness training program can improve the speed, agility and acceleration of the soccer players.

❖ **M Karthick, et al (2016):**

This study was designed to investigate effects of SAQ training on selected physical fitness parameters and kicking ability of High School Level male Football Players. To achieve the purpose of the study (N=30) High School Level male Football Players were selected from Government Higher Secondary School, Thummanatty, The Nilgiris. The subjects will be randomly assigned to two equal groups (n=15). Group- I SAQ Training (SAQTG) and Group - II was act as a control group (CG). The selected physical fitness parameters were speed (50 m) and agility (10 X4) kicking ability (Warner soccer test). The initial test was taken for both the groups. After the initial test respective training was given to the experimental groups for 3 days per week (Monday, Wednesday and Friday) days the period of twelve weeks. The control group was not be given any sort of training except their routine. The data collected from the subjects was statistically analyzed with 't' ratio to find out significant improvement if any at 0.05 level

of confidence. The result of this speed, agility and kicking ability improved significantly due to effects of SAQ training with the limitation of ( diet, climate, life style ) status and previous training the result of the present study coincide findings of the investigation done by different experts in the field of sports sciences, Due to the influence of effects of SAQ training significantly improved selected physical fitness parameters and kicking ability of High School Level male Football Players.

❖ **MILANOVIC, et al., (2015):**

The aim of study was to determine the effect of 12 week speed, agility and quickness (SAQ) training program on speed and flexibility in young soccer players. These results indicate that SAQ may be more effective for improving sprint performance for soccer players. But more research is required to determine ideal training methods for improving acceleration and flexibility in young soccer players.

❖ **TRECROCI, et al.,(2011):**

The purpose of the study was to examine the effect of speed agility and quickness (SAQ) training on acceleration (5 and 20m), change of direction and speed (CODS) and reactive agility preadolescent soccer players. These findings indicate SAQ training would positively affect cognitive skill and initial sprint acceleration through middle childhood, offering useful guidance to soccer coaches

❖ **J STRENGTH COND RES, et al ., (2007):**

They conducted study on effective speed and agility conditioning methodology for random intermittent dynamic type sports. In these studies three received programmed methods and random method and a group receiving no conditioning, in that program group received SAQ. A total of 25 males and 21 females were included. This study concluded that PC improved in acceleration, leg power and SAQ appears to be a superior method for improving speed and agility

## SECTION C

### STUDIES RELATED TO ILLINOIS AGILITY TEST

❖ **Hachana, Y, et al (2013)**

The purposes of this study were first to assess the reliability and criterion-related validity of the Illinois change of direction (COD) Illinois Agility Test (IAGT) and second to determine whether a relationship with power and speed exists. A total of 105 male team sport athletes participated in this investigation. Repeat measurements in 89 subjects out of the 105 were performed to assess the test-retest reliability and the 95% confidence interval (CI) of the difference in the score between paired observations (minimal detectable change [MDC]95) of the COD IAGT. The intraclass correlation coefficient and the SEM values for the COD IAGT test were 0.96 (95% CI, 0.85–0.98) and 0.19 seconds, respectively. The smallest worthwhile change (0.20 seconds) for the IAGT was greater than its SEM (0.19 seconds). The MDC95 value for the IAGT was 0.52 seconds. Criterion-related validity of the COD IAGT was assessed in the 105 subjects. They performed the COD IAGT and the T-test. Both tests were significantly correlated ( $r = 0.31$  [95% CI, 0.24–0.39];  $p < 0.05$ ). The correlation between COD IAGT, acceleration, straight speed, and leg power was analyzed in all the 105 subjects. Pearson moment correlation revealed no association between acceleration and the COD IAGT. However, significant correlations were observed between the COD IAGT and leg power ( $r = 0.39$  [95% CI, 0.26 to 0.44];  $p < 0.05$ ), and speed ( $r = 0.42$  [95% CI, 0.37–0.51];  $p < 0.05$ ). When controlling for speed with partial correlation, the significant relationship between the COD IAGT and leg power disappeared. In conclusion, the COD IAGT seems to be a reliable and valid test, whose performance is significantly related to speed rather than to acceleration and leg power.

❖ **Michele A. Raya, et al (2013):**

Performance-based outcomes such as the T-Test, Edgren Side Step Test (ESST), and Illinois Agility Test (IAT) have been used to assess agility in athletes and nonathletic; however, the reliability and validity of these tests have not been established. The purpose of this study was to establish the reliability and convergent construct validity of the ESST, Test, and IAT in young, nondisabled, physically active male service members (SMs). Ninety-seven male Active Duty U.S. Army SMs completed the study.

Statistically significant differences were not found between the ESST ( $p = 0.10$ ), T-Test ( $p = 0.09$ ), and IAT ( $p = 0.23$ ) when administered twice within a 24 to 48 h period. These tests were found to have excellent interrater reliability and moderate to good test-retest reliability. A good positive relationship exists between the IAT and T-Test ( $r = 0.76$ ,  $p < 0.001$ ) and a moderate negative relationship exists between the ESST and both the T-Test ( $r = -0.69$ ,  $p < 0.001$ ) and IAT ( $r = -0.65$ ,  $p < 0.001$ ). The results suggest that these tests are valid measures of agility that uniquely assess movement in different planes, thus providing a comprehensive assessment of high-level mobility.

❖ **Mehmet Kutlu, et al (2012):**

The purpose of this study was both to develop a novel test to measure run, shuttle run and directional change agility, and soccer shots on goal with decision making and to compare it with other agility tests. Multiple comparisons and assessments were conducted, including test-retest, Illinois, Zig-Zag, 30 m, Bosco, T-drill agility, and Wingate peak power tests. A total of 113 Turkish amateur and professional soccer players and tertiary-level students participated in the study. Test-retest and inter-tester reliability testing measures were conducted with athletes. The correlation coefficient of the new test was .88, with no significant difference ( $p > 0.01 > 0.01$ ) between the test results obtained in the first and second test sessions. The results of an analysis of variance revealed a significant ( $p < 0.01$ ) difference between the T-drill agility and power test results for soccer players. The new agility and skill test is an acceptable and reliable test when considering test-retest reliability and inter-rater reliability. The findings in this study suggest that the novel soccer-specific agility and shooting test can be utilized in the testing and identification of soccer players' talents.

❖ **Michael G. Miller, et al (2006):**

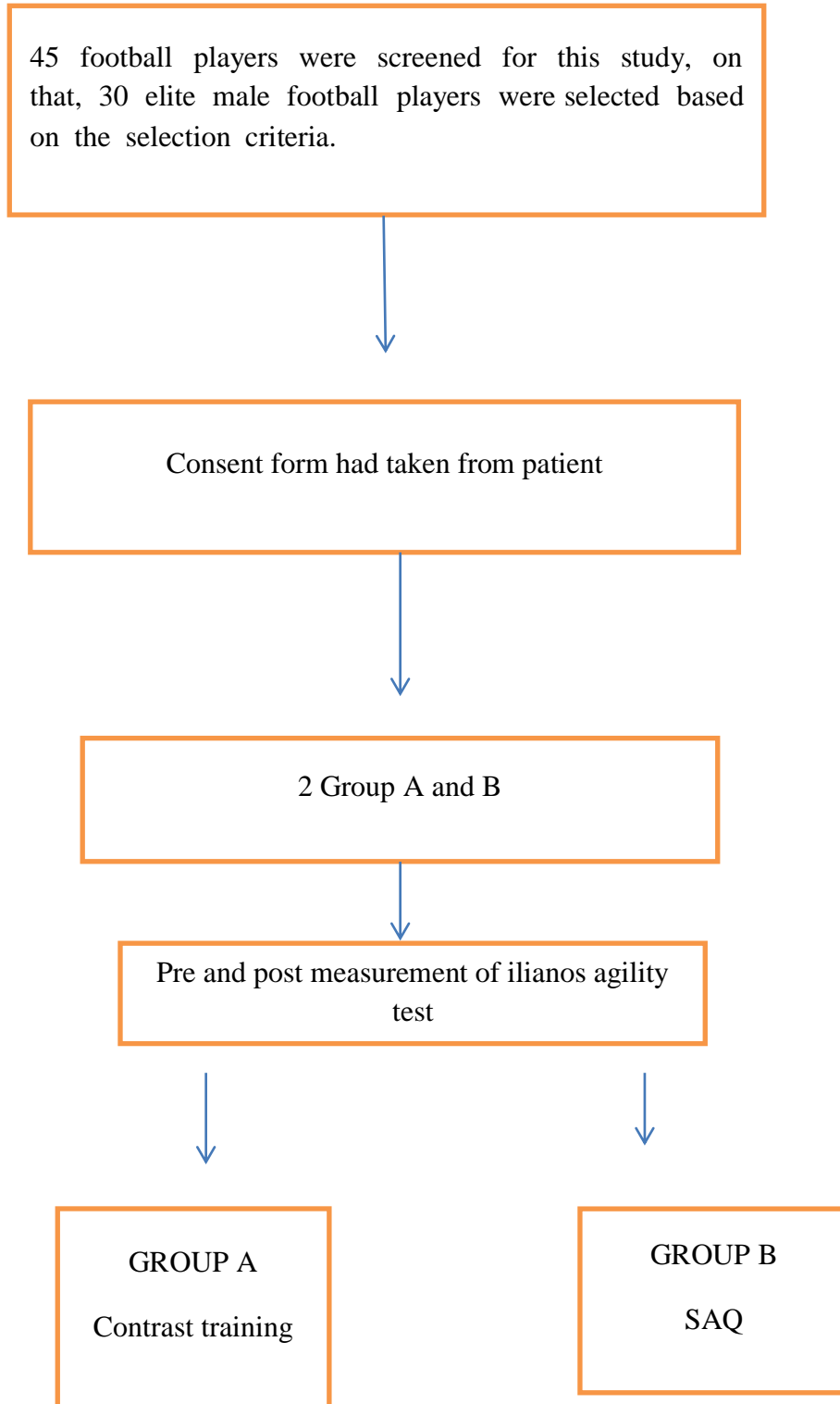
The purpose of the study was to determine if six weeks of plyometric training can improve an athlete's agility. Subjects were divided into two groups, plyometric training and a control group. The plyometric training group performed in a six week plyometric training program and the control group did not perform any plyometric training techniques. All subjects participated in two agility tests: T-test and Illinois Agility Test, and a force plate test for ground reaction times both pre and post testing,

❖ **Mohammed Nawi Alanazi Homoud, et al (2015)**

They conducted a study on relationships between Illinois agility test and reaction time in male athletes. To assess change-of direction speed in their athletes, field sport coaches could use reliable and valid tests. Illinois agility test (IAT) was designed to assess field sport change-of-direction speed. This study analyzed the reliability and validity of IAT, through comparisons to Illinois agility test (IAT) and reaction time (RT) performance in highly-trained junior football players. Methods: Totally, 20 high school soccer (age:  $24.04 \pm 1.45$  years; height:  $175.75 \pm 4.95$  cm; body mass:  $70.91 \pm 8.90$  kg), completed three tests. IAT was evaluated using photoelectric cells timing gates. The software "REACTION" was used to measure RT in response to visual stimulus. For the validity analysis, Pearson's correlations ( $p \leq 0.05$ ) analyzed between-test relationships. Results: IAT was significantly correlated with RT ( $r = 0.55$ ;  $p$ ). This study indicates that RT could be used as a valid predictor of IAT in field sport athletes.

# *METHODOLOGY*

### CHAPTER III



## **CHAPTER III**

### **3.1 METHODOLOGY**

#### **3.1.1 STUDY DESIGN:**

- The study was experimental design comparative with pre and posttest evaluation nature

#### **3.1.2 STUDY SETTING:**

- The study was conducted at college students of- Cherran's College of physiotherapy.

#### **3.1.3 STUDY DURATION:**

- The study was conducted for 12 weeks

#### **3.1.4 SAMPLING METHOD:**

- Subjects were selected by simple random method

#### **3.1.5 SUBJECTS:**

- 45 elite male selected for this study among 30 were selected based on the inclusion criteria



## **3.2 CRITERIA FOR SELECTION**

### **3.2.1 INCLUSION CRITERIA**

- Elite football players.
- Age: 19-23
- Gender :Male
- Player With 2 Year Experience
- Forward players
- Mid field players
- Defenders

### **3.2.2 EXCLUSION CRITERIA**

- Recent injury in lower limb
- Goal keeper
- Sub elite players
- Muscle tears
- Reduced cardiovascular endurance
- Players undergoing specific training

## **3.3 MATERIALS:**

- Cone
- Stopwatch
- Football
- Inch tape
- Agility disc
- Skipping rope
- Weighted disc
- Reaction ball

### **3.4 VARIABLES**

#### **INDEPENDENT VARIABLES:**

- Contrast training
- Speed agility quickness program

#### **DEPENDENT VARIABLE:**

- Agility

### **3.5 MEASUREMENT TOOLS:**

- Illinois agility test

### **ILLINOIS AGILITY TEST**

Test is set up with four cones forming the agility area(10 meter long \* 5meterswide ). Cone at point A, marking the start cone at B&C to mark the turning spots cone at point D to mark the finish. Place four cones in center of the testing. Area 3.3 meters apart. Player has to start lying face down with the hands at shoulder level. On the “go” command athlete begin and time starts when they cross the starting line. Get up and run the course in set path(left to right).

On the turn spots B and C, Be sure to touch the cones with your hand. Trailis complete when you cross the finish line and when no cones are knocked over.

The players were instructed to run along the pathway of marked cones and the time was noted before and after the training sessions and the time taken to complete the test was noted.

### **3.6 PROCEDURE:**

The objective and need for study were clearly explained to the ethical committee of Cherraan's college of physiotherapy and the permission was obtained. After that the study was planned to conduct at Cherran's College of physiotherapy.

45 football players were screened for this study, on that, 30 elite male football players were selected based on the selection criteria. The selected players were informed in detail about the training procedure prior the study. They were asked to submit the written informed consent form.

The players were randomly allocated into two groups by using convenient sampling method. group A consisted of 15 players and they were received with contrast training. Group B consisted of 15 players and they were received with speed agility and quickness training.

The players received contrast training and SAQ training for three times a week for a period of 12 weeks.

Illinois agility test was conducted before and after the training. The pre-test and post-test values was documented in means of time.

### **3.7 TRAINING SESSION:**

#### **❖ CONTRAST TRAINING:**

**The Group A consisted of 15 players and they were received with the training protocol of contrast training method.**

#### **❖ STATION 1:**

##### **90 DEGREE SQUAT EXERCISES:**

The players were instructed to maintain the position of squatting posture with the weight of about 85% of their repeated maximum of weighted disc on their shoulder.

##### **5 METERS HIGH SKIPPING:**

Followed by the squatting the players were instructed to perform a high skipping for a distance of about 5 meters.

##### **5 METERS SPRINT:**

Then the players were instructed to sprint for 5 meters.

#### **❖ STATION 2:**

##### **CALF EXTENSION EXERCISE:**

The players were instructed to stand on their toes with weight on their shoulder of about 90% of individual RM on weighted disc

##### **VERTICAL JUMP:**

Then the players were instructed to jump on their toes

##### **HIGH BALL HEADER:**

Then the players were instructed to make a high ball header with their head.

#### **❖ STATION3:**

##### **LEG EXTENSION EXERCISE:**

The players are instructed to extend their knee with resistance.

##### **JUMP FROM SEATED POSITION:**

After the completion of leg extension, the player has to jump from their seated position.

##### **DROP JUMPS:**

The player has to jump likewise the player taking a ball header from the stairs.

**PROTOCOL FOR CONTRAST TRAINING:**

<b>S.NO</b>	<b>STATION</b>	<b>EXERCISE</b>	<b>1 RM ON WEIGHTED DISC</b>
1.	1 <sup>st</sup> station	90deg squat exercise 5meters high skipping 5meters sprint	85%
2.	2 <sup>nd</sup> station	Calf extension exercise Vertical jumps High ball header	90%
3.	3 <sup>rd</sup> station	Leg extension exercise Jump from seated position Drop jump	80%



**PHOTO 01: 90DEGREE SQUAT**



**PHOTO NO: 2 CALF EXTENSIONS**



**PHOTO NO:3 LEG EXTENSION**



<b>WEEKS</b>	<b>STATION 1</b>	<b>STATION2</b>	<b>STATION 3</b>
1,2	6	6	6
3,4	7	7	7
5,6	8	8	8
7,8	9	9	9
9,10	10	10	10
11,12	11	11	11

- ❖ The numbers mentioned in the table represents the number of repetition that the exercise has to be done by the players.

❖ **SPEED AGILITY AND QUICKNESS TRAINING:**

The group B consisted of 15 layer and they were received with the training protocol of SAQ training method.

The SAQ training consisted of following exercises

- ❖ Agility disc
- ❖ Swerve development run
- ❖ Fast feet zig zag run
- ❖ Four turn four angle run
- ❖ Ball drops
- ❖ Side stepper drills.

### **AGILITY DISC:**

10 agility discs were placed within a distance of 1.5 feet and the player were instructed to run without touching the disc with their knee towards their chest. The players has to cross al the discs.

### **SWERVE DEVELOPMENT RUN:**

10 agility discs were placed within a distance of 1.5 feet and the players were instructed to run crossing the discs in the squatting position sideways. The squatting position has to be maintained by the player throughout the drill and has to cross all the discs.

### **FAST FEET ZIG ZAG RUN:**

In this discs are placed at the distance of about 2meters in a zig- zag manner, the players were instructed to run the pathway of disc.

### **FOUR TURN FOUR ANGLE RUN:**

Five discs were placed in the distance of 5meters forming square and adisc placed in te midpoint of the square. The players were instructed to run a from a point diagonally to the opposite end followed by running in border of square and to cross the square through the midpoint then to run along the border.

### **SIDE STEEPER DRILLS:**

The agility disc was placed within a distance of 1.5 feet and the players were instructed to run in sideways without the disc with their knee towards their abdomen.

### **BALL DROPS:**

After the completion of side stepper drills the player immediately has to catch the agility ball which may bounce at any direction.

**SPEED AGILITY AND QUICKNESS PROTOCOL:**

<b>WEEK</b>	<b>WARM UP</b>	<b>REPITATION</b>	<b>COOL DOWN</b>
1.	10	10	10
2.	10	10	10
3.	10	15	10
4.	10	15	10
5.	10	20	10
6.	10	20	10
7.	10	25	10
8.	10	25	10
9.	10	30	10
10.	10	30	10
11.	10	35	10
12.	10	35	10

- ❖ The number in this protocol represents the time duration in minutes of the warm up and cool down.
- ❖ Then repetition section denotes the number of time that the exercise has to be done.

*DATA ANALYSIS  
AND RESULTS*

## CHAPTER IV

### DATA ANALYSIS AND RESULT

#### MEAN

$$\bar{d} = \sum \frac{d}{n}$$

#### STANDARD DEVIATION

$$SD = \sqrt{\sum \frac{(d-\bar{d})^2}{n-1}}$$

#### PAIRED “t” TEST

$$t = \frac{\bar{d}\sqrt{n}}{S.D}$$

Where,

$\bar{d}$  = calculated mean difference pre-test and post-test.

n = sample size.

SD = standard deviation.

d = difference between pre and post-test.

## UNPAIRED “t” TEST

The unpaired t -test was used to compare the statistical significant difference between group A and group B

### FORMULA

$$s = \sqrt{\frac{(n_1-1)SD_1^2 + (n_2-1)SD_2^2}{n_1+n_2-2}}$$

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$n_1$  = total number of subject in group A.

$n_2$  = total number of subject in group B.

$x_1$  = difference between pre-test & post-test values of group A.

$x_2$  = difference between pre-test & post-test values of group B.

$\bar{x}_1$  = mean difference between pre-test & post-test value of group A

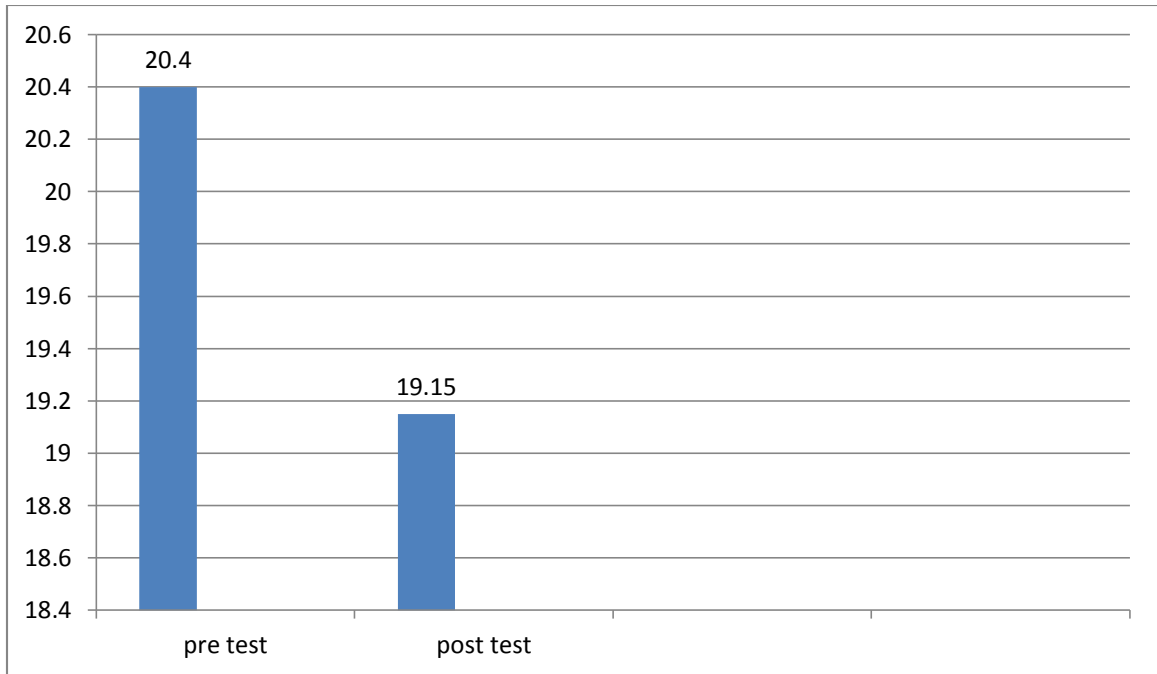
$\bar{x}_2$  = mean difference between pre-test & post-test value of group B.

### **WITHIN GROUP ANALYSIS OF GROUP A:**

<b>TEST</b>	<b>MEAN</b>	<b>SD</b>	<b>t value</b>	<b>P value</b>
<b>Pre</b>	20.40	0.614	6.029	<0.05
<b>Post</b>	19.15	0.510		

**TABLE NO: 01:** Within group analysis of agility in group A

The pre mean and standard deviation value of group A were 20.40 and 0.614. The post mean and standard deviation value of group A were 19.15 and 0.510. The t value and P values were 6.029 and 2.731. The obtained t value is greater than table the table value at the significance level of 0.05.hence the statistical report states that there was significant improvement in agility in group A.



**GRAPH NO:01: Graphical representation of within group analysis of group A.**

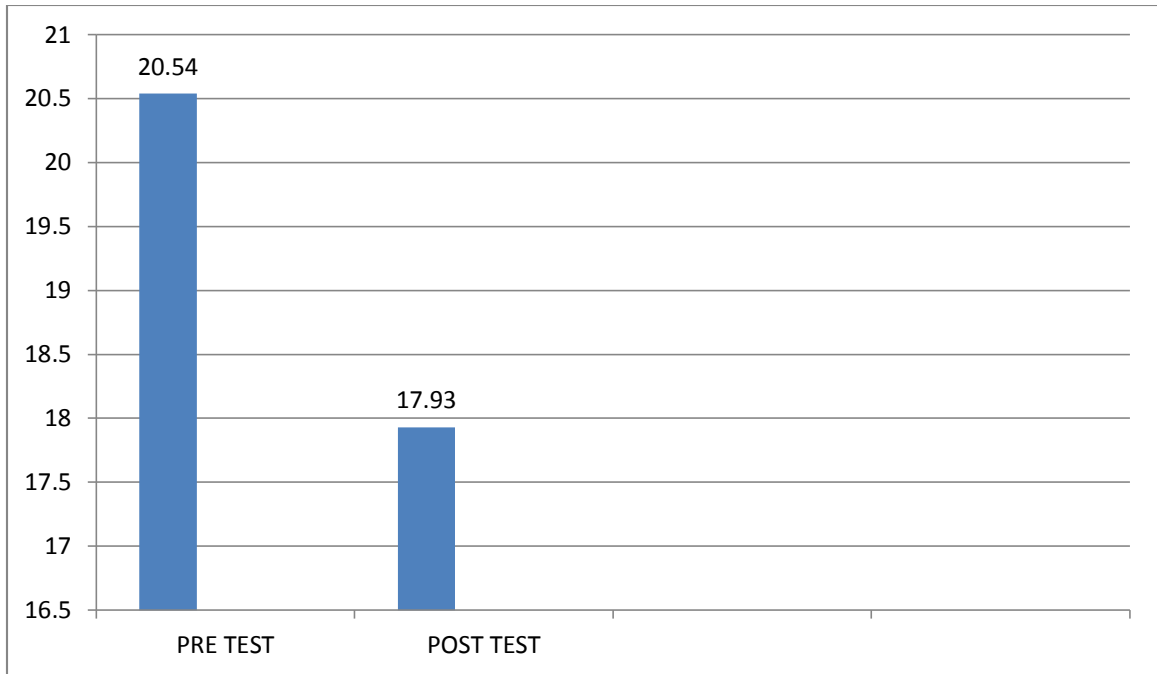


### **WITHIN GROUP ANALYSIS OF GROUP B:**

TEST	MEAN	SD	T value	P value
PRE	20.54	0.643	10.760	<0.05
POST	17.93	0.684		

**TABLENO:02:** within group analysis of agility in group B

The pre mean and standard deviation value of group B were 20.54 and 0.643. The post mean and standard deviation values of group B were 17.93 and 0.684. The t value and P values were 10.760 and 2.731. The obtained t value is greater than the table value at significant improvement in agility in group B.



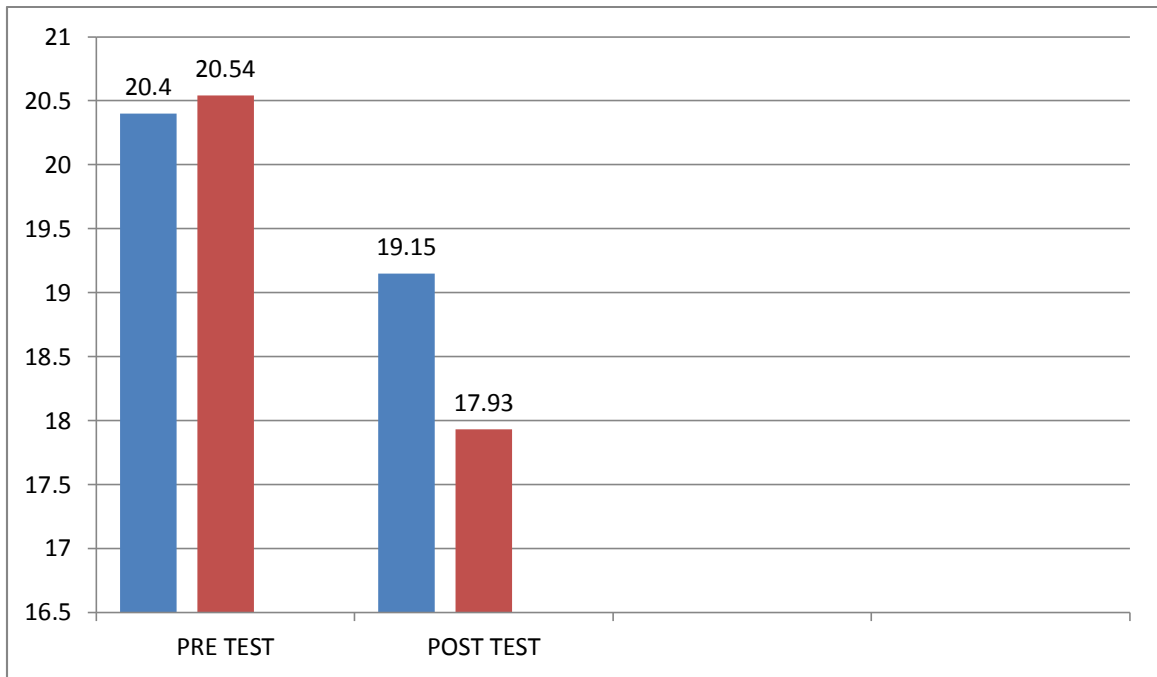
**GRAPH NO: 02: Graphical representation of within group analysis of Group B.**

### BETWEEN GROUP ANALYSIS :

TEST	GROUP	MEAN	SD	T value	P value
PRE	GROUP A	20.40	0.614	0.623	>0.05
	GROUP B	20.54	0.643		
POST	GROUP A	19.15	0.510	5.543	<0.05
	GROUP B	17.93	0.684		

**TABLE NO: 03: between group analysis of group A& group B**

The pre mean and standard deviation value of group A were 20.40 and 0.614. the pre-mean and standard deviation value of group B were 20.54 and 0.643. the t value and p value were 0.623 and 2.048. the obtained t value is lesser than the table value at the significance level of 0.05. the post mean and standard deviation value of group A were 19.15 and 0.510.the post test mean and standard deviation value of group B were 17.93 and 0.684. The t value and p values were 5.543 and 2.048. The obtained t values is greater than the table value at significance level of 0.05. Hence the statistical report states that there was significant improvement in agility after the posttest comparison.



**GRAPH NO: 03: Graphical representation of between group analysis of group A and group B**

# *DISCUSSION*

## **CHAPTER V**

### **DISCUSSION**

MARIOJOVANOVIC, et al. conducted a study to evaluate the effects of the speed, agility, quickness (SAQ) training method on power performance in soccer players. Soccer players were assigned randomly to 2 groups: experimental group (EG; n = 50) and control group (n = 50). Power performance was assessed by a test of quickness—the 5-m sprint, a test of acceleration—the 10-m sprint, tests of maximal speed—the 20- and the 30-m sprint along with Bosco jump tests—squat jump, countermovement jump (CMJ), maximalCMJ, and continuous jumps performed with legs extended. The initial testing procedure took place at the beginning of the in-season period. The 8-week specific SAQ training program was implemented after which final testing took place. The results of the 2-way analysis of variance indicated that the Improved significantly ( $p < 0.05$ ) in 5-m (1.43 vs. 1.39seconds) and in 10-m (2.15 vs. 2.07 seconds) sprints, and they also improved their jumping performance in countermovement(44.04 vs. 4.48 cm) and continuous jumps (41.08 vs. 41.39cm) performed with legs extended ( $p < 0.05$ ). The SAQ training program appears to be an effective way of improving some segments of power performance in young soccer players during the in-season period. Soccer coaches could use this information in the process of planning in-season training. Without proper planning of the SAQ training, soccer players will most likely be confronted with decrease in power performance during in-season period.

J STRENGTH, et al conducted a Study on effect of standard strength vs contrast strength training on development of sprint ability and jump junior soccer players. The players were divided into two groups. ST n=16 and CST n=16 age 16.0. The intervention are 5 meters sprint 9-3-6-3-9m sprint 180degree turn with backward and forward running repeated shuttle sprint ability squat and counter movement jump. They RCOD parameters show significant improvement SG and CG. They conclude that during the comparative session some measures of athletic performance in male soccer player were increased in CT group.

TRECROCI, et al. conducted the study to examine the effect of speed agility and quickness (SAQ) training on acceleration (5 and 20m), change of direction and speed (CODS) and reactive agility preadolescent soccer players. These findings indicate SAQ training would positively affect cognitive skill and initial sprint acceleration through middle childhood, offering useful guidance to soccer coaches

MEHREZ HAMMAMI, et al. conducted study on effect of contrast strength and plyometric training on lower limb explosive performance, ability to change direction and neuro muscular adaptation in soccer players. The aim was to compare the effect of two different 8 weeks contrast training and plyometric training on change of direction and counter movement jump, leg peak power on a cycle ergometer. 40 soccer players were taken for study age 15, BMI 58.8 were divided into two groups. The result EMG parameter shows significant increase in both groups. The improvement of physical performance was better with 8 weeks of CST than with PT. They conclude that contrast training can be used as an effective method on improving ability to change direction among soccer players

On current studies uses the contrast training for a period of 12 weeks on improving agility. results shows significant improvement on agility. Agility requires series of change of direction drills on compared to contrast training and there was no change of direction exercise present in contrast training.

# *CONCLUSION*



## **CHAPTER VI**

### **CONCLUSION**

#### **CONCLUSION:**

The study was conducted to compare the two training protocol which would improve agility. The two training protocol were contrast training and speed, agility, quickness program. 30 subjects were divided into two group by convenient sampling method and received protocol for about 3 times a week for 12 weeks of durations. Both groups were tested with agility through ilinois agility test before commencement of training and after training.

The study concluded that significant improvement in agility among football player in both groups. When compared to contrast training speed agility quickness program shows comparatively significant improvement in agility.

*LIMITATION AND  
SUGGESTION*

## **CHAPTER VII**

### **LIMITATION AND SUGGESTION**

#### **LIMITATIONS**

- It was a short duration study
- Subjects with 19 year of age were included in this study.
- Only male player were selected.
- Only elite player were selected.
- Illinois agility test were used to test agility of football player
- Selected male subjects were only given with contrast training

#### **SUGGESTIONS:**

- Subjects above 19 year of age can also be included in the upcoming studies.
- The study can be done with female player.
- Change of direction may added in order to improve agility quicker.
- Other outcome measure can also be included to get more accuracy on agility.
- These intervention of speed agility quickness and contrast training can also used in sports other than the football which requires change of direction repeatedly.

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# *ANNEXURE*

## CHAPTER X

### ANNEXURE I

#### ASSESSMENT CHART

Name :

Age :

Gender :

Height :

Weight :

BMI :

Year of experience :

Position of game :

Training period :

**ANNEXURE II**  
**CONSENT FORM**

I.....aged.....Mrs., voluntarily consent to participate

The research named “**A COMPARATIVE STUDY TO ANALYZE THE EFFICACY OF  
CONTRAST TRAINING PROGRAMME AND SPEED AGILITY QUICKNESS  
TRAINING ON AGILITY PERFORMANCE OF ELITE MALE FOOTBALL PLAYERS**”

The researcher has explained me the treatment approach in brief, risk of participation and has  
Answered all the questions pertaining to the study to my satisfaction.

**Signature of Subject**

**Signature of Researcher**

**Signature of Witness**

**ANNEXURE IV**  
**MASTER CHART 1**

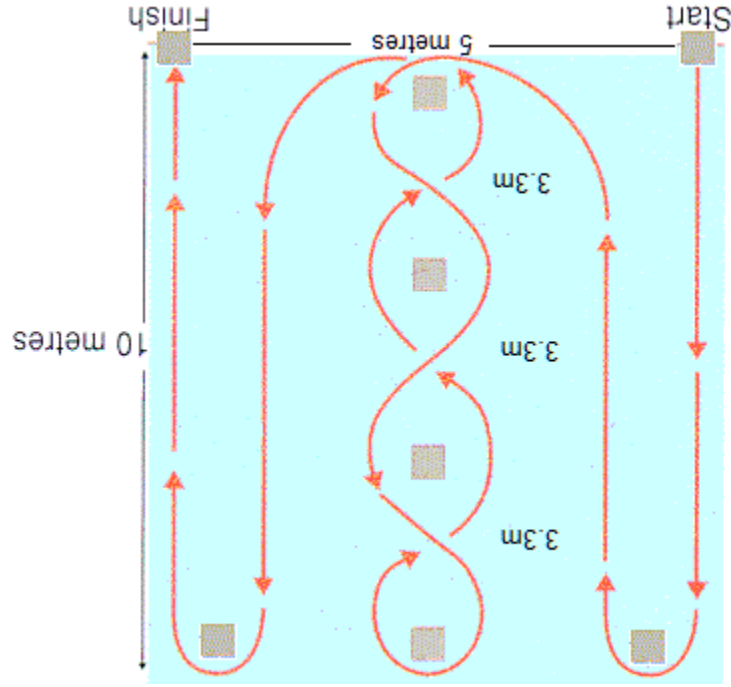
**PRE TEST AND POST TEST VALUE OF GROUP A**

<b>S.NO</b>	<b>PRETEST</b>	<b>POST TEST</b>
1.	20.12	19.02
2.	20.46	19.01
3.	21.08	19.22
4.	21.22	19.33
5.	20.76	18.98
6.	20.49	18.99
7.	19.88	19.42
8.	19.79	19.50
9.	20.06	19.02
10.	19.98	18.68
11.	18.99	18.02
12.	20.63	19.94
13.	20.94	19.94
14.	20.42	18.98
15.	21.22	20.22

## MASTER CHART 2

### PRE AND POST TEST VALUE OF GROUP B

S.NO	PRETEST	POSTTEST
1.	21.08	19.42
2.	20.50	17.89
3.	20.99	17.88
4.	21.08	18.06
5.	19.88	17.88
6.	19.90	17.05
7.	20.06	17.88
8.	20.41	17.56
9.	20.55	17.44
10.	18.98	16.88
11.	20.63	17.48
12.	21.42	18.48
13.	20.46	17.98
14.	21.22	18.90
15.	21.02	17.88



The players were instructed to run along the pathway of marked cones and the time was noted before and after the training sessions and the time taken to complete the test was noted.

Test is set up with four cones forming the agility area (10 meter long \* 5 meters wide). Cone at point A, marking the start cone at B&C to mark the turning spots cone at point D to mark the finish. Place four cones in center of the testing. Area 3.3 meters apart. Player has to start lying face down with the hands at shoulder level. On the "go" command athlete begin and time starts when they cross the starting line. Get up and run the course in set path (left to right). On the turn spots B and C, Be sure to touch the cones with your hand. Trail is complete when you cross the finish line and when no cones are knocked over.

## ILLINOIS AGILITY TEST:

### ANNEXURE III