CHAPTER II

REVIEW OF RELATED LITERATURE

In this chapter, the researcher has tried to present the effects of Yoga training intervention on Motor Fitness of Football population. Although, there are ample of literature available regarding impact of Yogic exercises on health and fitness, however, no study is available on Yoga in relation to Football related fitness of Football population. However, the researcher has gone through the reviews, which have been summarized below.

Mcnair, Daniel, P. (1968) conducted a study on those who were enrolled in physical education programme which covered soccer, touch Football, Basketball, and Wrestling. In addition to the physical education activity, one group was given a 5 minute interval run each exercise day; one group performed a stepping exercise of varied cadences for 2 1/2minutes; and a third group practiced 4 isometric exercises. The forth group engaged only in the physical education program. The subjects trained 3 days a week for 6 weeks. All group made highly significant gains in cardiovascular fitness, strength, and muscular endurance, but no differences were found among the groups.

N. Govindarajuluz, J. Gananadeepam and Bera T.K. (2003) have conducted the study yoga practices on flexibility and cardio-respiratory endurance. They have taken sixty high school girls (average 12 years) who were volunteered in a pre-experimental group ‘A’ (n1=30) for a period of eight weeks. The control group ‘B’ (n1=30) was not allowed to participate in the experimental treatment. The pre and post test were conducted on flexibility and cardio-respiratory endurance. The results of ANOVA revealed that there was an improvement in the flexibility and no significant change was evident in the cardio-respiratory endurance. Thus, short-term yoga is useful in improving flexibility, but not the cardio-respiratory endurance even at the stage of puberty in girls.
Mishra, S.R. and Bera, T, K. (2003) studied the Cardiac Efficiency of Long Distance runners and Yoga Practitioners. Cardiac efficiency of 120 male students in the age range 16 to 17 years, from the Aggarsain Public School, Kurukshetra, Haryana, was tested through Harvard Step Test. The students were divided into three equally matched groups viz; Long Distance running group (Gr.A), Yoga group (Gr.B) and control group (Gr.C). Duration of the experimental period was 6 month that was divided into two sessions of 3 months each. Result of 2x3 Factorial ANOVA revealed that yoga Practitioners had higher cardiac efficiency than long distance runners.

Paul, D. and Jr. Cangton (2005) have conducted the study on Cardiovascular and Motor Fitness. Three groups of 5th and 6th grade boys were given three weeks of instructions in rhythmic, basketball and wrestling respectively ANOVA plus the Finney ‘T’ test were used to determine , significance (p<10) of changes on resting diastolic blood pressure, 5 minutes step test, total body strength, the Illinois agility run and total ability body rate. It was found that basketball and wrestling were more effective in improving total body strength and that wrestling was more effective than basketball in improving total body rate. There were no other significant changes.

Lolage, R.S. and Bera, T.K. (2002) has conducted the study on forty (N-40) male college level kho-kho players, age ranged from 20 to 30 years, from Pravara College of physical education (Maharashtra) These players were randomly assigned into equal number of subjects in experimental and control groups. Their cardiovascular efficiency was assessed by administering three test viz., Harvard Step Test (r =0.63, p <0.01), 8-min. Run Test (r =0.73. p <0.01) and 1600 M Run Test (r =0.60, p <0.01). The experimental group underwent training of Pranayama (viz., anuloma – viloma, ujjayi, suryabhedana and bhashrika) in two sessions of 45 minutes each day (morning and evening), 6 days. Week 1 for a total period of 3 months. The subject of control did not participate in the above programme and were kept busy with interesting activities, separately, during the experimental period. The results of ANCOVA revealed – 1) treatment effect of Pranayama on three test of cardiovascular efficiency were not identical, 2) Harvard step test could measure cv efficiency with insufficient reliability (r=0.82, p<0.01, r=0.80,
p<0.01). 3) Selected Pranayama were found useful in improving cv endurance of kho-kho players.

**Bera, T.K. and Rajpurkar, M. V. (1993)** studied on 40 male high school student’s age 12 to 15 years Participated for a study in relation to body composition cardiovascular endurance and anaerobic process. The subjects were placed into two subject’s viz. yoga group and control group. Body composition, cardiovascular endurance and anaerobic power was measuring standard method. The duration of experiment was one year. The result of ANCOVA revealed that significant improvement in ideal body weight, body density cardiovascular endurance and anaerobic power was observed as a result of yoga training. This study does not show the significant diameter and most of the body circumferences. It was evident that some of the fat folders. (Triceps, sub scapular suprailiac, umbilical thing and calf) and body circumferences (waist, unibilical and hip) were reduced.

**Joglekar Anjali (1999)** studied skills in badminton and associated fitness abilities of sixty female students (n=60), age 18-20 years, from S.N.D.T Arts and Smt. C.B. College of Commerce & Economics for Women, Mumbai. Selected yoga practices were the training intervention for 6 weeks. This was a controlled study. Result revealed that yoga played an efficient role for improving not only the skills of badminton, but the level of physical fitness too.

**Robson Moses (1973)** reported positive effect of yoga exercises on breath control and flexibility. In this experiment 4 flexibility measures, 4 variation of breath holding, vital capacity and an attitude questionnaire about the activity were administered to 27 male students in the beginning and end of 14 weeks of yoga-physical education classes. The changes in these measurements were compared to an equal number of students drawn at random from a variety of other physical education classes. ANOVA showed that yoga students made greater increases than the non-yoga group in hip, trunk and neck flexibility in 3 of four variations of breath-holding and in vital capacity. The result of the attitude questionnaire indicated that yoga students had more positive attitude about the benefits of yoga than the non-yoga group had about the activities in which they were enrolled.
Bhole, M.V. and Karambelkar, P.V. (1972) reported positive improvement in vital capacity and breath-holding time of physical education professionals. The study was carried out every year from 1959 to 1969 on the subjects who came for Yoga Summer Camp Course held every year at Lonavla (India). Thus total number of subjects raised to 147 of varying age of 18-50 years.

There was a positive improvement found in terms of vital capacity and breath holding time but the improvement was not significant. It was discussed that since all the subjects were from physical education profession therefore they were expected to be at their best efficiency of their respiratory apparatus.

In a study conducted by Khodeskar, A.N. (1988) on breath control, 50 male Kabaddi players of age group 18-25 years of local Physical Education Training College were divided into two groups equally that is experimental group and control group. The yogic training programme was given to experimental group for 6 weeks for 45 minutes daily except Sunday. Both the groups were being involved in the common physical education programme of the college in addition to the experimental stimulus. The result showed that the training based on some simple yogic exercises do have positive effect on increasing the cardio respiratory endurance. Post training values indicate improvement in cant ability, vital capacity, breath-holding time and the physical fitness index.

A milestone study on steadiness and psychomotor co-ordination was conducted by Kocher, H.C. (1974) with a view to evaluate the effect of yoga exercises on steadiness as claimed as well as to examine the influence of these practices on psycho-motor co-ordination, and the relationship between steadiness and co-ordination. Out of all the subjects (N=37), 13 were tested before and after yoga practices (8 months duration) and remaining 24 were further divided into two groups consisting of 14 subjects in Group-A and 10 subjects in Group-B. The subjects of Group-B (1 month) were tested only after yoga training and were not familiar with the experiment while Group-A of 14 subjects were tested before and after yoga training (1 month).
The group of 13 subjects (8 months duration) were experimented for two hand coordination as well as for hand steadiness but remaining 24 (Group-A & B) were tested only for two hand coordination. The results revealed that, steadiness and two hand coordination were improved significantly after 8 months as well as after 1 month yoga training.

Another study which was conducted by Pratap, V. (1968) also supports the view that yoga practices increase steadiness in normal’s. In this study, 34 students of yoga (26 males and 8 females) served as subjects, 22 male and female served as subjects in the experiment with hand straight e.g., tense condition before and after yoga training and the remaining 12 in experiment with hand relaxed i.e., relaxed condition before and after yoga training. There was a significant increase in steadiness in normal after yoga practices compare with their initial scores on steadiness before yoga practices. Hand relaxed subjects as compared with relatively tense subjects were found to show greater steadiness.

Kocher, H.C. (1972) measured steadiness by Mirror Tracing Test on 36 subjects (21 for experimental group and 15 for control group). After pre testing the experimental group was given yoga practices for 8 months. After this experimental period, both the groups were again tested. The result revealed that, there was significant improvement in hand steadiness among yoga practitioners as compared with control group in terms of errors on Mirror Tracing Test.

According to Kocher, H.C. and Pratap, V. (1972) yoga practices are supposed to reduce the high activation level. The condition of high activation seems to increase the disorganization of motor responses. These practices are intended to stabilize the psycho-physiological mechanism so that there is less and less tendency towards an imbalance in face of external and internal stimuli. Thirty three subjects (22 male and 11 female average age 26.8 years) were subjected to two hand coordination tests and an electrical chronoscope 1/100th sec. was used to record total time and contact errors of the motor task given. The result supported the claim that yoga practices reduce the psycho physiological disequilibrium and stabilize the mechanism in the face of external and internal stimuli.
Sahu, R.J. and Gharote, M.L. (1984) conducted the experiment of psychomotor performance on 17 males and 11 females undergoing training course in yoga. Test was administered before and after yoga training programme. The subjects were required to place 100 pins one after another in 100 holes. It was clear from the t-test value that there was improvement in dexterity of both male and female. This may be due to better neuro-muscular coordination as a result of yoga training.

In this continuation, there is one more investigation which is worth mentioning. According to Sahu, R.J. and Bhole, M.V. (1983) various yoga training programmes are intended to release psycho physiological tensions and develop a state of relaxed behavior in the individual, with this background; an individual can have better performance involving speed and accuracy. This study was conducted on 10 male subjects of age 25-45. Their psycho-motor performance was studied by way of their ability to make dots on the chart paper of the McDougall-Schust Apparatus. This experiment continued for three week yoga training programme. It was seen that the performance went on increasing from week to week. It was calculated that Yogic training programmes increased performance which involved speed and accuracy.

Paranjape, S.D. and Bhole, M.V. (1979) conducted a study to examine the effect of yogic training on resting neuro-muscular activity. Ten males (N=10), age ranged from 25-30 years, undergoing nine months training served as subjects for this study. The effect was recorded on Finger Ergograph. There was a decreased neuro-muscular activity in all three tests at the end of Yoga training programme. It also could be seen that as the subjects continued to work there was a better performance in later attempts. This change indicates the possible role of yogic training on resting neuro-muscular activity and work performance.

Gore, M.M. (1987) also supported the same findings when he conducted a study to examine the effect of yogic training on neuro-muscular efficiency in normal and stressful conditions. Finger ergography under normal and stressful conditions, tested on experimental subjects, undergoing yogic training for 3 weeks duration reduced delayed fatigue, increase in the period of performance and total
work out put, when compared with an ergo graphic test on subjects in control group.

Sahu, R.J. and Gharote, M.L. (1985) observed that yogic training for short duration brings about significant improvement on the perception of depth and distance. Forty (N=40) normal subjects were selected and divided into randomly 20 subjects for experimental group and 20 subjects for control group. Experiment was carried out for 21 days. Pre-test and post-test were administered on all the subjects to measure their depth perception with the help of depth perception box constructed for this purpose. Yoga brought about significant improvement on the perception of depth and distance which supports that visual perception is improved with the help of yoga practices.

Kocher, H.C. and Pratap, V. (1972) conducted a study to see the relation between anxiety level and yoga practices. The English version of the Anxiety Scale Questionnaire (ASQ) was administered on fifty six students who (43 males and 13 females) had undergone yoga training for a month. Scores were taken before and after one month yoga training. The result of ‘t’ test revealed that there was significant reduction in total anxiety scores in the normal subjects after yoga treatment as compared to their initial condition. The results also indicated that yogic practices may prove useful in reducing the anxiety level.

Forty subjects (N=40) of summer camp certificate course for one month served as subjects (age 16 to 60 years) in an experiment conducted by H.C. Kocher (1976). The purpose of this experiment was to evaluate the effect of yoga practices on anxiety and hostility. The Anxiety Test Questionnaire (ASQ) and Hostility Questionnaire were administered to whole group initially and after yoga training. The yoga practice period consisted of 90 minutes every day carried over three weeks. The study concluded that there was no change in the score of control group, whereas significant reduction was observed in the scores on general hostility and anxiety among the experimental group.

Kocher, H. C. and Pratap, V. (1971) made an attempt to verify the popular claim of yoga that it provides emotional stability to its practitioners. If it is
true, it may be hypothesized that there will be greater outlet for each stimulus word which means a decrease of emotional complexes. Twenty seven students (22 males and 5 females) served as subjects. The practice period consisted of 90 minutes per day for three weeks. Test I and Test II were administered to see the effect of yogic practices and Test III was given to see the effect of language of responses. In Test III, the equivalent stimulus words were taken in English instead of Hindi. Overall results show that yogic practices as well as spiritual practices related to yoga have tremendous effects on sequence of ideas and are also helpful in reducing the emotional complexes.

Gharote, M.L. (1973) assessed the improvement in physical fitness of 27 male and 12 female subjects after three weeks of yoga training. For the assessment of physical fitness a comprehensive battery of tests evolved by Fleishman was used. The pre test and post test scores were collected. The result indicated that the training in yogic exercises definitely improved the general fitness of male and female individuals with special emphasis on the fitness factors of flexibility, trunk strength and equilibrium.

Indian police personnel’s physical fitness levels were examined by Gharote, M. L. and Ganguly, S.K. (1973) Nine weeks training in yogic physical culture was helpful to improve general physical fitness level of 49 police cadets who were already conditioned to physical activities as against control group of 49 engaged only in school schedule as judged through (a) Fleishman Basic Fitness Test, (b) Cureton’s Flexibility test, (c) Skin fold and Harvard Step Test. The improvement was most significant in extent flexibility.

While reviewing the research literature on shooting and novel motor skills, it has been observed that the investigations have been focused mainly in the following areas of research.

Bhatia, R.K. and Premlata (2005) studied “Effect of Selected Yogic Exercises on Balance and Perception of College Level Players”. The major responses to make our posture and balance, excellent examples on movements based on integrated sensory information. Both vision and kinesthetic provide
information for balancing, but during infancy and early childhood we sometimes rely more on visual information and kinesthetic information. Performance on various balance tasks improve throughout childhood and adolescence, although the timing of these improvement depends on the type, static or dynamic, and the nature of the task.

Keeping this in view, the investigators have made an experimental study on the balance and perception of female players, to find out the effect of yogic exercises on balance and perception, this experiment was made on forty female players of college level. For this players were selected as subjects from University College of Kurukshetra University. The sample was further divided in to two groups, the group A, and B. The test of balance (Static and Dynamic) and perception were taken as criterion measure. Gr. A was given a programme of selected Yogic Asanas for a period of six weeks, while gr. B was kept controlled. The analysis of data showed that yogic exercises were found effective to develop perception and balance.

Carling, C. and Dupont, G. (2011) with the aim conducted this study to determine whether decline in physical performance in a professional soccer team during match-play were associated with reductions in skill-related performance. Computerized tracking of performance in midfield players (n = 11) showed that total distance and distance covered in high-speed running (>14.4 km · h⁻¹) were greater in the first versus second half of games (both P < 0.001) and in the first versus the final 15 min of play (P < 0.05).

Analysis of high-speed running across 5-min periods showed that more distance was covered in the first versus the final game period, and in the peak period of activity compared with the following period and game mean for other periods (all P < 0.05). Analysis of skill-related measures revealed no significant decline between halves, across 15-min intervals or in the 5-min period following that of peak high-speed activity compared with the game mean for other 5-min periods.
In contrast, frequencies of passing, ball possessions, and duels were greater in the first 5-min than in the final 5-min period (P < 0.05). Neither physical nor skill-related performance was affected across three consecutive games within a period of ≤7 days. The results suggest that the players were generally able to maintain skill-related performance throughout games and when competing in successive matches within a short time.

Castagna, C., et. al. (2010) with the purpose conducted this study to examine the relationship between popular endurance field tests and physical match performance in elite male youth soccer players. Eighteen young male soccer players (age 14.4 ± 0.1 years, height 1.67 ± 4.8 cm, body mass 53.6 ± 1.8 kg) were randomly chosen among a population of elite-level soccer players.

Players were observed during international championship games of the corresponding age categories and randomly submitted to the level 1 of the Yo-Yo intermittent recovery test (Yo-Yo IR1), the Multistage Fitness Test (MSFT), and the Hoff test on separate occasions. Physical and physiological match demands were assessed using Global Positioning System technology and short-range telemetry (GPS Elite, Canberra, Australia), respectively. Players covered 6,087 ± 582 m (5,098-7,019 m) of which 15% (930 ± 362 m; 442-1,513) were performed as a high-intensity activity. During the first and second halves, players attained 86.8 ± 6.5 and 85.8 ± 5.8% of maximum heart rate (HRmax; p = 0.17) with peak HRs of 100 ± 2 and 99.4 ± 3.2% of HRmax, respectively. Players' Yo-Yo IR1 and MSFT performance were significantly related (r = 0.62-0.76) to a number of match physical activities.

However, the Hoff test was only significantly related with sprint distance (r = 0.70, p = 0.04). The Yo-Yo IR1 showed a very large association with MSFT performance (r = 0.89, p < 0.0001). The results of this study showed that the Yo-Yo IR1 and MSFT may be regarded as valuable tests to assess match fitness and subsequently guide training prescription in youth soccer players. The very strong relationship between Yo-Yo IR1 and MSFT suggests their use according to the period of the season and the aerobic fitness level of the players. Because of the
association of the Yo-Yo IR1 and MSFT with match physical performances, these tests should be considered in talent selection and development of players.

**Ozgünen, K. T., et. al. (2010)** found in their study that heat stress may contribute to decreased match performance when football is played in extreme heat. This study evaluated activity patterns and thermal responses of players during soccer matches played in different environmental conditions. Non-acclimatized soccer players (n=11, 20±2 years) played two matches in conditions of moderate heat (MH) and high heat (HH) index. Core temperature (T(c)) and physical performance were measured using a telemetric sensor and a global positioning system, respectively.

The average ambient temperature and relative humidity were MH 34±1 °C and 38±2%; HH 36±0 °C and 61±1%. Peak T(c) in the MH match was 39.1±0.4 °C and in the HH match it was 39.6±0.3 °C. The total distance covered in the first and second halves was 4386±367 and 4227±292 m for the MH match and 4301±487 and 3761±358 m for the HH match. Players covered more distance (P<0.001) in the first half of the HH match than in the second half. In football matches played at high environmental temperature and humidity, the physical performance of the players may decrease due to high thermal stress.

**Bandelow, S., et. al. (2010)** investigated the cognitive effects of exercising in the heat on the field players of two football teams in a series of three matches. Different rehydration and cooling strategies were used for one of the teams during the last two games. Cognitive functions were measured before, during and immediately after each football match, as well as core temperature, body mass, plasma osmolality and glucose levels, allowing an estimate of their differential impacts on cognition.

The pattern of results suggests that mild-moderate dehydration during exercise in the heat (up to 2.5%) has no clear effect on cognitive function. Instead, plasma glucose and core temperature changes appear to be the main determinants: higher glucose was related to faster and less accurate performance, whereas core temperature rises had the opposite effect.
The 50% correlation between plasma glucose and core temperatures observed during exercise in the heat, may help to stabilize cognitive performance via their opposing effects. The glucose-like effects of sports drinks appear to be mediated by increased plasma glucose levels, because drinks effects became non-significant when plasma glucose levels were added to the models. The cooling intervention had only a beneficial effect on complex visuo-motor speed.

Kurdak, S. S., et al. (2010) found during a football match played in warm (34.3 ± 0.6 °C), humid (64 ± 2% rh) conditions, 22 male players had their pre-match hydration status, body mass change, sweat loss and drinking behavior assessed. Pre-match urine specific gravity (1.012 ± 0.006) suggested that all but three players commenced the match euhydrated.

Players lost 3.1 ± 0.6 L of sweat and 45 ± 9 mmol of sodium during the 90-min match and replaced 55 ± 19% of their sweat losses and hence by the end of the game were 2.2 ± 0.9% lighter. The water volume consumed during the game was highly variable (1653 ± 487 mL; 741-2387 mL) but there was a stronger relationship between the estimated pre-game hydration status and water volume consumed, than between sweat rate and water volume consumed. In a second match, with the same players 2 weeks later in 34.4 ± 0.6 °C, 65 ± 3% rh, 11 players had a sports drink available to them before and during the match in addition to water.

Total drink volume consumed during the match was the same, but approximately half the volume was consumed as sports drink. The results indicate that substantial sweat water and electrolyte losses can occur during match play in hot conditions and a substantial water and sodium deficit can occur in many players even when water or sports drink is freely available.

Maughan, R. J. (2010) Dehydration and hyperthermia both, if sufficiently severe, will impair exercise performance. Dehydration can also impair performance of tasks requiring cognition and skill. Body temperature may exceed 40 °C in competitive games played in hot weather, but limited data are available. Football played in the heat, therefore, poses a challenge, and effects on some
aspects of performance become apparent as environmental temperature increases above about 12-15 °C.

Prior acclimatization will reduce the impact of high environmental temperatures but provides limited protection when humidity is also high. Ingestion of fluids is effective in limiting the detrimental effects on performance. Drinks with added carbohydrate and electrolytes are generally more effective than plain water and drinks may be more effective if taken cold than if taken at ambient temperature. Pre-exercise lowering of body temperature may aid some aspects of performance, but the efficacy has not been demonstrated in football.

Aughey, R. J. (2010) in his research suggested elite Australian footballers undertake pacing strategies to preserve high intensity activity later in matches. However, this research used GPS with slow sample rates, did not express performance relative to minutes played during games and used lowly ranked players.

In this study movement was recorded by GPS at 5 Hz. Running performance was expressed per period of the match (rotation) divided into low-intensity activity (LIA, 0.10 to 4.17 m x s(-1)); high-intensity running (HIR, 4.17 to 10.00 m x s(-1)) and maximal accelerations (2.78 to 10.00 m x s(-2)). All data were expressed relative to the first period of play in the match and the magnitude of effects was analyzed with the effect size (ES) statistic and expressed with confidence intervals.

The total and LIA distance covered by players did not change by a practically important magnitude during games (ES< 0.20). High intensity running was reduced in both rotations of the second quarter, Q3R2 and both rotations of the fourth quarter (ES -0.30 ± 0.14; -0.42 ± 0.14; -0.30 ± 0.14; -0.42 ± 0.14; and -0.48 ± 0.15 respectively). Maximal acceleration performance was reduced in Q1R2, and each rotation of the second half of matches.

When expressed per minute of game time played, total distance and low intensity activity distance are not reduced by a practically important magnitude in
AF players during a match. These data are therefore inconsistent with the concept of team sport players pacing their effort during matches. However, both high intensity running and maximal accelerations are reduced later in games, indicative of significant fatigue in players

**Gains, G. L., et. al. (2010)** conducted this study to determine the difference in 40-yd dash and probability times performed on field turf (FT) and natural grass (NG). Red-shirt freshmen National Collegiate Athletic Association Division II college football players (n = 24) performed 2 trials each of a 40-yd dash and proagility run on each surface. Sprints were timed by an electronic timing system (ET) and by 2 hand timers (HTs). Agility was timed on each surface by 2 HTs.

There was no significant difference in 40-yd dash times between FT and NG using ET (FT: 5.34 ± 0.30 seconds, NG: 5.33 ± 0.33 seconds) or HT (FT: 5.06 ± 0.31 seconds, NG: 5.11 ± 0.29 seconds). Hand timer 40-yd dashes were significantly faster than ET 40-yd dashes on both surfaces, with the difference between HT and ET on FT (-0.28 ± 0.11 seconds) significantly greater than the difference on NG (-0.22 ± 0.06 seconds). The time differences between surfaces were significantly correlated (r = 0.12, p = 0.56). Proagility times were significantly faster on FT (4.49 ± 0.28 seconds) than on grass (4.64 ± 0.33 seconds). Thus, it appears that straight-ahead sprint speed is similar between FT and NG, but change-of-direction speed may be significantly faster on FT.

**Stodden, D. F. and Galitski, H. M. (2010)** conducted study with a purpose to examine the longitudinal effects of a strength and conditioning program on selected body composition and performance data over 4 consecutive years of training. Body mass, percent body fat, lean body mass, proagility (18.3 m shuttle), 36.6-m (40-yd) sprint, bench press, chin-ups, vertical jump, and power index data for 84 National Collegiate Athletic Association division IA collegiate football players were examined.

In addition to examining data on all athletes, data were analyzed on specific groups categorized by position. Groups were categorized as (a) skill (wide
receivers, defensive backs, and running backs), (b) big skill (linebackers, kickers, tight ends, quarterbacks, and specialists), and (c) line (offensive and defensive linemen). Data on each individual performance criteria were analyzed using pairwise t-tests to indicate changes from year to year. Results for all participants showed that the greatest number of significant improvements among test parameters occurred during the first year of training. Years 2-4 of training demonstrated inconsistent improvement among the test parameters. Bench press performance significantly improved throughout 4 years of training among all participants.

Data analysis from specific position groups also revealed the greatest number of significant improvements occurred during the first year of training. Overall, the results of this study clearly demonstrate that the greatest rate of improvement in the selected performance parameters occurred during the initial year of the strength and conditioning programme. This study provides valuable information for coaches to establish appropriate progression and programme variation guidelines for athletes over consecutive years of training.

Schache, A. G., et. al. (2011) demonstrated the potential for a simple clinical test of hamstring muscle strength to identify susceptibility to muscle strain injury. A single-case design was used; specifically, an elite-level male Australian Rules football player performed bilateral isometric maximum voluntary contractions of the hamstring muscles on a weekly basis for a period of 5 weeks preceding a right hamstring muscle strain injury.

Minimal asymmetry (no greater than ±1.2% difference) was evident in the hamstring isometric maximum voluntary contractions during the first 4 weeks, but 5 days prior to injury, the right hamstring isometric maximum voluntary contraction was reduced by 10.9% compared to the left.

Measuring asymmetry in isometric maximum voluntary contractions of the hamstring muscles may be a useful clinical test to identify susceptibility to muscle strain injury.
Fuller, C. W., et. al. (2010) conducted a study to develop, implement and assess an interactive, football-based health education programme for children in South Africa. 370 children making up two intervention groups (Grade 6: 125; Grade 7: 131) and one control group (Grade 7: 114).

Eleven 90 min sessions, each divided into two 45 min halves of Play Football (football skills) and Play Fair (health issues), each session focused on one specific health risk factor. Health knowledge using a 20-item questionnaire; coaches' attitudes towards their training programme using a 10-item questionnaire and children's attitudes towards the health education programme using a six-item questionnaire.

Children in the Grade 7 intervention group showed significant (p<0.05) increases in the proportion of correct responses for nine of the 20 health knowledge questions post intervention, and these increases were maintained at 3 months post intervention. The Grade 6 intervention group showed significant increase in the proportion of correct responses for 15 of the 20 health knowledge questions post intervention. The Grade 7 control group showed a significant increase in the proportion of correct responses to one of the 20 health knowledge questions post-Play Football sessions and nine of 20 questions post-Play Fair sessions. Over 90% of the children provided positive attitude responses to the health-education programme.

The programme demonstrated that it was possible to implement a football-based health-education programme for children in Africa that achieved significant increases in health knowledge and that was also well received by participants.

Wood, G. and Wilson, M. R. (2010), studied while facing penalty kicks in football (soccer), goalkeepers frequently incorporate strategies that are designed to distract the kicker. However, no direct empirical evidence exists to ascertain what effect such visual distractions have on the attentional control, and performance, of footballers. Eighteen experienced footballers took five penalty kicks under counterbalanced conditions of threat (low vs. high) and goalkeeper movement (stationary vs. waving arms) while wearing eye-tracking equipment. Results
suggested that participants were more distracted by a moving goalkeeper than a stationary one and struggled to disengage from a moving goalkeeper under situations of high threat. Significantly, more penalties were saved on trials when the goalkeeper was moving and shots were also generally hit closer to the goalkeeper (centrally) on these trials. The results provide partial support for the predictions of attentional control theory and implications for kickers and goalkeepers are discussed.

Molacek, Z. D., et. al. (2010) conducted the study with the purpose to determine the effects of acute low- and high-volume static and proprioceptive neuromuscular facilitation (PNF) stretching on 1-repetition maximum (1RM) bench press. Fifteen healthy male National Collegiate Athletic Association Division II football players (age: 19.9 +/- 1.1 years; weight: 98.89 +/- 13.39 kg; height: 184.2 +/- 5.7 cm; body composition: 14.6 +/- 7.4%; and 1RM bench press: 129.7 +/- 3.3 kg) volunteered to participate in the study.

Subjects completed 5 different stretching protocols integrated with a 1RM dynamic warm-up routine followed by 1RM testing in randomly assigned order. The protocols included (a) no stretching (NS), (b) low-volume PNF stretching (LVPNFS), (c) high-volume PNF stretching (HVPNFS), (d) low-volume static stretching (LVSS), and (d) high-volume static stretching (HVSS). Two and 5 sets of stretching were completed for the low- and high-volume protocols, respectively. The stretching protocols targeted triceps and chest/shoulder muscle groups using 2 separate exercises.

There were no significant differences in 1RM bench press performance (p > 0.05) among any of the stretching protocols NS (129.7 +/- 3.3 kg), LVPNFS (128.9 +/- 3.8 kg), HVPNFS (128.3 +/- 3.7 kg), LVSS (129.7 +/- 3.7 kg), and HVSS (128.2 +/- 3.7 kg). We conclude that low- and high-volume PNF and static stretching have no significant acute effect on 1RM bench press in resistance-trained collegiate football players. This suggests that resistance-trained athletes can include either (a) a dynamic warm-up with no stretching or (b) a dynamic warm-up in concert with low- or high-volume static or PNF flexibility exercises before
maximal upper body isotonic resistance-training lifts, if adequate rest is allowed before performance.

**Comyns, T. M., et. al. (2010)** undertook the study to examine the effect of a heavy weight training exercise on sprinting performance and on the effect of repeated exposure to a complex training protocol. Eleven male rugby union players (age 20.9 +/- 3.1 years) participated in the study, which involved 5 separate testing sessions. Back squat 3 repetition maximum (3RM) was established in session 1. Sessions 2-5 were identical and involved the subjects completing a 30-m sprint before and after a 3RM back squat protocol. Four minutes of rest was given between the back squatting and the post-test 30-m sprint.

All sprint trials were measured with a laser measurement device (LAVEG, Jenoptik, and Jena, Germany). Sprint time and instantaneous, average, and maximum velocity were the dependent variables. The criterion for significance was set at an alpha level of $p > 0.05$. No significant improvement was evident for any of the testing sessions ($p > 0.05$). In session 1, there was a significant increase in 30-m time and a significant reduction in average 30-m velocity and maximum velocity ($p < 0.05$).

The expected benefits in sprinting may not have been realized because of intra and inter subject variations in sprint technique. The session x phase interaction revealed a significant improvement in the pre to posttest changes in instantaneous velocity at 20 m ($p = 0.035$) and 30 m ($p = 0.036$) from session 1 to session 4. This indicates that the rugby players may be able to learn to apply the potentiating effects of complex training. From a practical perspective, players may need repeated exposure to this training modality to gain benefit from it, and this should be reflected in programme planning.

**Brechue, W. F. and Mayhew, J. L. (2009)** conducted study to assess changes in upper-body muscular strength and work capacity following off-season resistance training and the resultant effect on prediction of muscular strength (1 repetition maximum, or 1RM). National Collegiate Athletic Association (NCAA) Division II football players ($n = 58$) were divided into low-strength (LS, 1RM <275 lb, $n = 23$) and high-strength (HS, 1RM > or =275 lb, $n = 35$) groups based
on initial 1RM bench press. Maximal repetitions to failure (RTF) were performed with a relative (60, 70, 80, and 90% of 1RM) and absolute load (185 lb for players with 1RM <275 lb; 225 lb for players with 1RM > or =275 lb) at pre- and post-training. Following training (n = 58), there was a significant increase in 1RM bench press (22.8 +/- 12.0 lb) and body mass (3.7 +/- 10 lb).

There was no change in the number of repetitions performed (RTF) during relative load testing following training. However, RTF during absolute load testing was increased. Relative and absolute load work capacity (reps x load) increased with training, but there was no relationship between the change in work capacity and the changes in muscular strength. Predicted 1RM were better at lower repetitions (3-5 RM, >85% 1RM) than at higher repetitions (>6RM, < or =80% 1RM) at both pre-and post-training. In conclusion, changes in muscular strength associated with the off-season training program used herein appear to have little effect on work capacity or prediction of 1RM using submaximal loads. For repetition predictions to accurately track changes following resistance training, the test load must be relatively high (>85% 1RM) and the repetitions low (< or =5 reps).

McBride, J. M., et. al. (2009) with the purpose of investigation to examine the relationship between maximal squat strength and sprinting times. Seventeen Division I-AA male football athletes (height = 1.78 +/- 0.04 m, body mass [BM] = 85.9 +/- 8.8 kg, body mass index [BMI] = 27.0 +/- 2.6 kg/m2, 1 repetition maximum [1RM] = 166.5 +/- 34.1 kg, 1RM/BM = 1.94 +/- 0.33) participated in this investigation. Height, weight, and squat strength (1RM) were assessed on day 1. Within 1 week, 5, 10, and 40 yard sprint times were assessed. Squats were performed to a 70 degree knee angle and values expressed relative to each subject’s BM. Sprints were performed on a standard outdoor track surface with timing gates placed at the previously mentioned distances.

Statistically significant (p < or = 0.05) correlations were found between squat 1RM/BM and 40 yard sprint times (r = -0.605, p = 0.010, power = 0.747) and 10 yard sprint times (r = 0.544, p = 0.024, power = 0.626). The correlation approached significance between 5 yard sprint times and 1RM/BM (r = -0.4502, p
= 0.0698, power = 0.4421). Subjects were then divided into those above 1RM/BM of 2.10 and below 1RM/BM of 1.90. Subjects with a 1RM/BM above 2.10 had statistically significantly lower sprint times at 10 and 40 yards in comparison with those subjects with a 1RM/BM ratio below 1.90. This investigation provides additional evidence of the possible importance of maximal squat strength relative to BM concerning sprinting capabilities in competitive athletes.

Brophy, R. H., et. al. (2009) Observed that the relationship between turf toe and a plantar foot pressure has not been extensively studied. Two hypotheses were tested in a cohort of professional American football players: first, that a history of turf toe is associated with increased peak hallucal and first metatarsophalangeal (MTP) plantar pressures; second, that decreased range of motion (ROM) of the first MTP correlates with increased peak hallucal and first MTP plantar pressures.

Forty-four athletes from one National Football League (NFL) team were screened for a history of turf toe during preseason training. Dorsal passive MTP ROM and dynamic plantar pressures were measured in both feet of each player. Anatomical masking was used to assess peak pressure at the first MTP and hallux.

First MTP dorsiflexion was significantly lower in halluces with a history of turf toe (40.6 +/- 15.1 degrees versus 48.4 +/- 12.8 degrees, p = 0.04). Peak hallucal pressures were higher in athletes with turf toe (535 +/- 288 kPa versus 414 +/- 202 kPa, p = 0.05) even after normalizing for athlete body mass index (p = 0.0003). Peak MTP pressure was not significantly different between the two groups tested. First MTP dorsiflexion did not correlate with peak hallucal or first MTP pressures.

This study showed that turf toe is associated with decreased MTP motion. In addition, increased peak hallucal pressures were found. Further study is warranted to determine whether these pressures correlate with the severity of symptoms or progression of turf toe to first MTP arthritis.
Ghigiarelli, J. J., et al. (2009) conducted this study to explore the effects of a 7-week heavy elastic band and weighted-chain program on maximum muscular strength and maximum power in the bench press exercise. Thirty-six (n = 36) healthy men aged 18-30 years old, from the Robert Morris University football team, volunteered to participate in this study. During the first week, predicted 1 repetition maximum (1RM) bench press and a 5RM speed bench press tests were conducted. Subjects were randomly divided into 3 groups (n = 12): elastic band (EB), weighted chain (WC), and traditional bench (C). During weeks 2-8 of the study, subjects were required to follow the prescribed resistance training program. Mean and SD of the predicted 1RM bench press and 5RM speed bench press were computed.

A two-factor (method X time) analysis was applied to identify significant differences between the training groups. Significance was set at alpha = 0.05. Results indicated a significant time (p < 0.05) but no group effect for both predicted 1RM (kg) and 5RM peak power tests (watts). Although not significant, results did show greater no significant improvements in the EB (848-883 W) and WC groups (856-878 W) vs. control (918-928 W) when the 2 highest and greatest values were selected regarding peak power. The use of EB and WC in conjunction with a general off-season strength and conditioning program can increase overall maximum upper-body strength in a sample of Division 1-AA football players. These types of training modalities add a unique training style and more flexibility with respect to exercise prescription for athletes and strength practitioners.

Hoffman, J. R., et al (2009) conducted this study to examine the efficacy of periodization and to compare different periodization models in resistance trained American football players. Fifty-one experienced resistance trained American football players of an NCAA Division III football team (after 10 weeks of active rest) were randomly assigned to 1 of 3 groups that differed only in the manipulation of the intensity and volume of training during a 15-week offseason resistance training program. Group 1 participated in a nonperiodized (NP) training program, group 2 participated in a traditional periodized linear (PL) training program, and group 3 participated in a planned nonlinear periodized (PNL)
training program. Strength and power testing occurred before training (PRE), after 7 weeks of training (MID), and at the end of the training program (POST).

Significant increases in maximal (1-repetition maximum [1RM]) squat, 1RM bench press, and vertical jump were observed from PRE to MID for all groups; these increases were still significantly greater at POST; however, no MID to POST changes were seen. Significant PRE to POST improvements in the medicine ball throw (MBT) were seen for PL group only. The results do not provide a clear indication as to the most effective training program for strength and power enhancements in already trained football players. Interestingly, recovery of training-related performances was achieved after only 7 weeks of training, yet further gains were not observed. These data indicate that longer periods of training may be needed after a long-term active recovery period and that active recovery may need to be dramatically shortened to better optimize strength and power in previously trained football players.

Harrison, A. J. and Bourke, G. (2009) conducted the study to demonstrate that resistance sprint (RS) training can produce significant changes in running speed and running kinematics. The longer-term training adaptations after RS training remain unclear. The purpose of this study was to investigate whether an RS training intervention would enhance the running speed and dynamic strength measures in male rugby players. Fifteen male rugby players aged 20.5 (+/- 2.8) years who were proficient in resisted sledge training took part in the study. The subjects were randomly assigned to control or RS groups. The RS group performed two sessions per week of RS training for 6 weeks, and the control group did no RS training.

Pre- and post intervention tests were carried out for 30-m sprint, drop, squat, and rebound jumps on a force sledge system. A laser measurement device was used to obtain velocities and distance measures during all running trials.

The results show a statistically significant decrease in time to 5 m for the 30-m sprint for the RS group (p = 0.02). The squat jump and drop jump variables also showed significant increases in starting strength (p = 0.004) and height
jumped \((p = 0.018)\) for the RS group from pre- to post-testing sessions. The results suggest that it may be beneficial to employ an RS training intervention with the aim of increasing initial acceleration from a static start for sprinting.

**Thomas, K., et. al. (2009)** with the aim of this study to compare the effects of two polymetric training techniques on power and agility in youth soccer players. Twelve males from a semi professional football club's academy \((age = 17.3 +/- 0.4\) years, stature = 177.9 +/- 5.1 cm, mass = 68.7 +/- 5.6 kg) were randomly assigned to 6 weeks of depth jump (DJ) or countermovement jump (CMJ) training twice weekly. Participants in the DJ group performed drop jumps with instructions to minimize ground-contact time while maximizing height. Participants in the CMJ group performed jumps from a standing start position with instructions to gain maximum jump height.

Post training, both groups experienced improvements in vertical jump height \((p < 0.05)\) and agility time \((p < 0.05)\) and no change in sprint performance \((p > 0.05)\). There were no differences between the treatment groups \((p > 0.05)\). The study concludes that both DJ and CMJ plyometrics are worthwhile training activities for improving power and agility in young soccer players.

**Clarke, R. A., et. al. (2008)**, studied with the purpose to compare the peak force and force curve characteristics during a traditional bench press (BP) and a ballistic bench throw (BT). Eight \((age = 21.0 +/- 2.3\) years, height = 182.3 +/- 7.4 cm, body mass = 85.9 +/- 5.5 kg) semi-professional rugby league players with resistance and power training experience performed both BP and BT exercises at loads of 55 and 80% of their predicted one-repetition maximum. The force curves for each test were then divided into three intensity levels, set at low to moderate \((0-75\%)\), high \((75-95\%)\), and near-maximal force \((95-100\%)\). These values were obtained by determining the percentage of the range of motion (ROM) in which the force produced during each test was within these thresholds.

The BT exercise produced significantly \((p < 0.05)\) higher peak force than BP under both loading conditions. A significantly greater portion of the ROM during the 80% BT was at a high intensity in comparison with the BP. No
significant differences were found between force intensity conditions at 55% loads. It can be concluded that performing the BT exercise results in a greater peak force output when compared with the traditional BP movement under both resistance training and maximal power loading conditions. Furthermore, performing the BT exercise with heavy loads results in a more efficient training method for maintaining high force levels throughout the ROM.

Perez-Gomez, J., et. al. (2008), studied the effects of a training programme consisting of weight lifting combined with polymetric exercises on kicking performance, myosin heavy-chain composition (vastus lateralis), physical fitness, and body composition (using dual-energy X-ray absorptiometry (DXA)) was examined in 37 male physical education students divided randomly into a training group (TG: 16 subjects) and a control group (CG: 21 subjects). The TG followed 6 weeks of combined weight lifting and polymetric exercises. In all subjects, tests were performed to measure their maximal angular speed of the knee during in-step kicks on a stationary ball.

Additional tests for muscle power (vertical jump), running speed (30 m running test), anaerobic capacity (Wingate and 300 m running tests), and aerobic power (20 m shuttle run tests) were also performed. Training resulted in muscle hypertrophy (+4.3%), increased peak angular velocity of the knee during kicking (+13.6%), increased percentage of myosin heavy-chain (MHC) type IIa (+8.4%), increased 1 repetition maximum (1 RM) of inclined leg press (ILP) (+61.4%), leg extension (LE) (+20.2%), leg curl (+15.9%), and half squat (HQ) (+45.1%), and enhanced performance in vertical jump (all p < or = 0.05).

In contrast, MHC type I was reduced (-5.2%, p < or = 0.05) after training. In the control group, these variables remained unchanged. In conclusion, 6 weeks of strength training combining weight lifting and polymetric exercises results in significant improvement of kicking performance, as well as other physical capacities related to success in football (soccer).

Sidiropoulou, M. P., et. al. (2007) placed emphasis in screening individuals with exercise-induced bronchospasm in order to avoid persistence
bronchial hyperactivity and consequent chronic silent inflammation of the respiratory tract. The purpose of this study was to evaluate the effect of interval training on the respiratory function and endurance in children with exercise-induced asthma (EIA) participating in the sport of soccer.

Twenty-nine boys ages 10-14, who developed EIA after a 6-minute free running test (decline in forced expiratory volume in 1 second: FEV(1)10%), participated in the study. They were divided into 2 groups (experimental: n = 18, and control: n = 11), fulfilling the same criteria (i.e., age, body height and weight, and severity of asthma). The experimental group exercised with the interval training method for a period of 8 weeks, (3 sessions per week), whereas the control group exercised with the usual football program. Measurements were made for FEV(1) and endurance in both groups, before and after the application of training (8 weeks). Following the implementation of the training program, a significant improvement in FEV(1) and endurance was documented in the experimental group, as well as significant differences between the 2 groups. In conclusion, duration and aerobic training via the interval method seems to be beneficial to soccer players with EIA.

Acharya, B.K. et al. (2010), conducted study on Twenty male junior footballers younger than 15 years of age, belonging to the Mohun Bagan Athletic Club, Kolkata, were selected for the study at Haridwar. They had to play in a Football Cup organized in UK and they were here to practice yoga sequences taught by Swami Ramdevji. They were of age 14.65±0.58 years and none of them had a history of lipid metabolism disorders. All the footballers were healthy with no history of smoking or alcohol consumption. The scope and objectives of the present study were explained to the subjects and their written consent was obtained for participation in the study.

The institutional ethical committee had approved the study protocol and design. The subjects were asked to follow their routine diet and exercise pattern during the period of study. None of the subjects were exposed to yogic practices before this yoga training session. There was a significant reduction in the levels of serum cholesterol, Low-density lipoprotein (LDL) cholesterol, serum triglycerides,
and very-low-density lipoprotein (VLDL)-cholesterol at the end of the yoga session. The results indicated that the fasting blood sugar (FBS) level was positively elevated in junior footballers. This demonstrated that Pranayama and Yogasana were helpful in regulating sugar level.

**Donohue, B., et al. (2006),** conducted study to examine the efficacy of two preparatory interventions on one mile run performance in 90 high school long distance runners. After participants had completed a one mile baseline run, they were randomly assigned to participate in either one of two interventions (brief yoga exercises, motivational shouting exercises) or a no intervention control condition. Experimental conditions were implemented one week after the baseline run about 20 minutes before a second one mile trial.

Participants assigned to the motivational intervention improved their running performance significantly more than those assigned to the other two conditions. Although the magnitude of the effect was small, participants assigned to yoga exercises showed significant improvements in running performance relative to control condition participants. Consumer satisfaction ratings indicated that participants who were assigned to the motivational and yoga exercise groups liked their interventions more than those assigned to the control group.

Motivational and yoga interventions designed to improve long distance running performance were equally acceptable to the participants, but the former had a greater effect.

**Elliott, M. C., et al. (2011),** Investigated about hamstring strain injuries at the elite level exist in sports such as Australian Rules football, rugby, and soccer, but no large-scale study exists on the incidence and circumstances surrounding these injuries in the National Football League (NFL). Hypothesis: Injury rates will vary between different player positions, times in the season, and across different playing situations. Descriptive epidemiology study between 1989 and 1998, injury data were prospectively collected by athletic trainers for every NFL team and recorded in the NFL’s Injury Surveillance System. Data collected included team, date of injury, activity the player was engaged in at the time of injury, injury
severity, position played, mechanism of injury, and history of previous injury. Injury rates were reported in injuries per athlete-exposure (A-E). An athlete-exposure was defined as 1 athlete participating in either 1 practice or 1 game.

Over the 10-year study period 1716 hamstring strains were reported for an injury rate (IR) of 0.77 per 1000 A-E. More than half (51.3%) of hamstring strains occurred during the 7-week preseason. The preseason practice IR was significantly elevated compared with the regular-season practice IR (0.82/1000 A-E and 0.18/1000 A-E, respectively). The most commonly injured positions were the defensive secondary, accounting for 23.1% of the injuries; the wide receivers, accounting for 20.8%; and special teams, constituting 13.0% of the injuries in the study.

Hamstring strains are a considerable cause of disability in football, with the majority of injuries occurring during the short preseason. In particular, the speed position players, such as the wide receivers and defensive secondary, as well as players on the special teams units, are at elevated risk for injury. These positions and situations with a higher risk of injury provide foci for preventative interventions.

Austin, D., et.al (2001), with the purpose to describe the match-play demands of professional rugby union players competing in Super 14 matches during the 2008 and 2009 seasons. The movements of 20 players from Super 14 rugby union team during the 2008 and 2009 seasons were video recorded. Methods using time-motion analysis (TMA), five players from four positional groups (front-row forwards, back-row forwards, inside backs and outside backs) were assessed. Results Players covered between 4218m and 6389m during the games.

The maximum distances covered in a game by the four groups were: front row forwards (5139m), back row forwards, (5422m), inside backs (6389m) and outside backs (5489m). The back row forwards spent the greatest amount of time in high-intensity exercise (1190s), followed by the front row forwards (1015s), the inside backs (876s) and the outside backs (570s). Average distances covered in individual sprint efforts were: front row forwards (16m), back row forwards (14m),
inside backs (17m) and outside backs (18m). Work to rest ratios of 1:4, 1:4, 1:5, and 1:6 were found for the front row and back row forwards, and inside and outside backs respectively.

The Super 14 competition during 2008 and 2009, have resulted in an increase in total high-intensity activities, sprint frequency, and work to rest ratios across all playing positions. For players and teams to remain competitive in Super 14 rugby, training (including recovery practices) should reflect these current demands.

Dicks, M., et al. (2010), claimed that pressing concern within the literature on anticipatory perceptual-motor behavior is the lack of clarity on the applicability of data, observed under video-simulation task constraints, to actual performance in which actions are coupled to perception, as captured during in-situ experimental conditions. They developed an in-situ experimental paradigm which manipulated the duration of anticipatory visual information from a penalty taker's actions to examine experienced goalkeepers' vulnerability to deception for the penalty kick in association football. Irrespective of the penalty taker's kick strategy, goalkeepers initiated movement responses earlier across consecutively earlier presentation points.

Overall goalkeeping performance was better in non-deception trials than in deception conditions. In deception trials, the kinematic information presented up until the penalty taker initiated his/her kicking action had a negative effect on goalkeepers' performance. It is concluded that goalkeepers are likely to benefit from not anticipating a penalty taker's performance outcome based on information from the run-up, in preference to later information that emerges just before the initiation of the penalty taker's kicking action.

Nicholls, M. E. et al. (2010), Cerebral asymmetries for spatial attention generate a bias of attention--causing lines to be bisected to the left or right in near (within reach) and far (outside reach) space, respectively. This study explored whether the rightward deviation for bisecting lines in far space extends to tasks
where a ball is aimed between two goal-posts. Kicking was assessed in a laboratory and a real-life setting.

In the laboratory setting, 212 participants carried out three conditions: (a) kick a soccer ball at a single goal post, (b) kick a soccer ball between two goal posts and (c) use a stick to indicate the middle between two goal posts. The goals were placed at a distance of 4.0 m. There was no deviation in the one-goal kicking condition-demonstrating that no asymmetries exist in the perceptual motor system when aiming at a single point. When kicking or pointing at the middle between two goal posts, rightward deviations were observed.

In the real-world setting, the number of misses to the left or right of goal (behinds) in the Australian Rules football for the 2005-2009 seasons was assessed. The data showed more rightward deviations for kicks at goal. Combined, the studies suggest that the rightward deviation for lines placed in far space extends to the kicking of a football in laboratory and real-life settings. This asymmetry in kicking builds on a body of research showing that attentional asymmetries impact everyday activities.

Tran, D. (2001), M studied ten healthy, untrained volunteers (nine females and one male), ranging in age from 18-27 years, to determine the effects of hatha yoga practice on the health-related aspects of physical fitness, including muscular strength and endurance, flexibility, cardio respiratory fitness, body composition, and pulmonary function.

Subjects were required to attend a minimum of two yoga classes per week for a total of 8 weeks. Each yoga session consisted of 10 minutes of pranayamas (breath-control exercises), 15 minutes of dynamic warm-up exercises, 50 minutes of asanas (yoga postures), and 10 minutes of supine relaxation in savasana (corpse pose). The subjects were evaluated before and after the 8-week training program.

Isokinetic muscular strength for elbow extension, elbow flexion, and knee extension increased by 31%, 19%, and 28% (p<0.05), respectively, whereas isometric muscular endurance for knee flexion increased 57% (p<0.01). Ankle
flexibility, shoulder elevation, trunk extension, and trunk flexion increased by 13% (p<0.01), 155% (p<0.001), 188% (p<0.001), and 14% (p<0.05), respectively. Absolute and relative maximal oxygen uptake increased by 7% and 6%, respectively (p<0.01). These findings indicate that regular hatha yoga practice can elicit improvements in the health-related aspects of physical fitness. (c) 2001 CHF, Inc.

**Ulger, O. and Yağlı, N. V. (2011)** conducted a study with the purpose to investigate the effects of yoga on balance and gait properties in women with musculoskeletal problems.

Twenty-seven women (30-45 years old) with musculoskeletal problems, such as osteoarthritis and low-back pain, were included in the present study. The patients participated in 8 sessions (twice weekly for 4 weeks) of a yoga program which included asanas, stretching exercises, and breathing techniques.

Patients' static balance measurements and gait parameters were determined before and after the study using a stabilometer and a gait trainer, respectively. Post-study values of patients' gait parameters were found to be statistically higher than their pre-study values (p < 0.05) the values of patients' balance addressed anterior and right positions with patients' eyes open and subsequently closed pre-treatment. However, it was notable that balance post-treatment was minimal when subjects eyes were open or closed. Anterior-posterior values and right-left values were almost equal after treatment.

The results showed that yoga has a positive effect on balance and gait parameters of women with gait and balance disturbances that are caused by musculoskeletal problems. It is feasible to conclude that asanas and stretching exercises included in the yoga program brought about such a positive effect, and therefore it is possible to use yoga programs to solve problems caused by musculoskeletal disorders.

The experiment of **Bera, T.K., et. al. (1990)** evaluated the effect of a one year yogic exercises training programme on body density and its selected
substantiate variables. Fat folds were taken from the triceps, sub scapular, post sacroiliac, chin and mid auxiliary sites by a Lange caliper in 20 each experimental and control male subjects before and after one year progressive training regimen. Yogic exercise training consisted regimen. Yogic exercise training consisted of 17 practices.

ANCOVA revealed significant increment in body density & ideal body weight (P<0.001) for the experimental group as compared to the control group. However, significant gains in percent body fat and absolute fat weight were observed in control group while compared with the experimental one (p<0.001). The results demonstrate that the conventional yogic exercise does a] preferentially reduce the percent body fat & absolute fat weight & b] significantly increases the ideal body weight & body density.

Kulkarni and Datar, (1997) studied the effect of yoga (Asanas & pranayama) in cardiac efficiency in random selected subjects of age group 18 to 24 years. Their cardiac efficiency was tested before yogic training 30 males & 10 females actual as control the subject underwent yoga asanas & Pranayama training for 21 days. Training included 60 min/ day, where different Asanas performed for 15 minutes each day.

Malathi, A. and Parulkar, V. G. (1992) studied the effect of yogasanas on visual and auditory the reaction time (VRT, ART) was studied in 83 healthy male subjects of 30-40 years of age who had never practiced yogasanas before. These subjects were divided into two groups viz. Group A whose VRT and ART was determined after 1 hr. yogasanas and Group B whose ART and VRT was determined after 6 weeks yogasanas training programme. VRT and ART showed a significant reduction in Group A (P < .05) and Group B (P < 0.01).

Kewal, Krishan et. al. (2004) study was conducted with the aim to find out the effect of yogic asana on physical fitness of college level players in relation to sports performance for this purpose 80 female players of different games were taken as sample. These eight players were further divided into two equal groups of 40 each one group 12 weeks and the other group was kept controlled. Result show
that regular practice of yogasana improved same of the physical fit components but other had no effect of it.

Ghosh, S. K. (2003) Under took study to find out the effect of physical exercise, yogic practices and their combined training on selected physiological variables among high school Boys age ranged from 13-15 years were randomly divided into four group of equal number (N=60) physical exercise group, yogic practice group, combined group and control group. The experimental group underwent twelve weeks treatment programme. Both pre and posts were made for the collection of data.

The data collection was made on the selected physiological variable namely, pulse rate, respiratory rate, breath holding time & mean arterial pressure. The results of analysis of covariance (ANCOVA) followed by the Schaffer’s test showed significant decrease in all the groups except control group. Between combined group and yoga group physical exercise group & yoga group a significant difference in paired adjusted final mean is seen but there was no significant difference in pulse rate in combined group when compared with the physical exercise group.

**Researcher’s View**

The literature presented in this section indicates that ample of research investigations have been done on Football game. Many investigators suggested different training schedules of exercises and strategies for enhancing related fitness and various skills in Football. Researcher feels that training strategies for enhancing such skills must be based on the scientific reasoning and the composition of such training must be formulated depending upon players’ cultural heritage. No research evidence in this line is available so far till to date.