

## CHAPTER-II

### REVIEW OF RELATED LITERATURE

It is always better to know the opinions and suggestions of experts and previous researches, in support of the study undertaken. A panoramic view of the related literature becomes necessary in order to have a clear understanding in this direction. The views and statements taken from various authoritative sources have been presented in this chapter in a sequential order.

It is generally acknowledged that the researcher must be cognizant of the literature in his area of interest before embarking upon a research project. It is necessary to ascertain the 'state of the art', which determines what is known on the subject, what questions have raised from previous works, which are required for the study and the benefits that could be gained from the experience of other investigations. The current explanation of literature, however, makes it extremely difficult for the researchers to keep up with the latest information in this field.

A sincere and scholarly attempt has been made by the investigator to go through the relevant literature. A brief review of the studies related to the problem is described to get a full picture of what has been done with regard to the problem under study. To examine the problem under study, reference of research materials from the books, periodicals, journals etcetera are collected to bring about a deep and clear prospect of the field of study.

## 2.1 STUDIES ON PSYCHOLOGICAL TRAINING PROGRAMMES

Lucette Toussaint and Yannick Blandin (2010) conducted a study on “The role of imagery modalities on motor learning” The aim of the study was to examine specifically how the sensory conditions available during physical practice of a task might influence the subsequent use of motor imagery. As a pre test, participants had to physically reproduce knee joint positions with or without vision. Second, they practised motor imagery (15 and 150 trials) with visual, kinaesthetic or visuo-kinaesthetic imagery. A control group with no imagery was included. Post-tests were then performed 10 min and 24 h after each imagery session in a sensory condition similar to that used in the pre-test. The Results showed that efficient motor imagery instructions have to take account of the sensory information available during physical experience of the task: kinaesthetic or visuo-kinaesthetic imagery in a no-vision condition, and visual imagery or, to a lesser extent, visuo-kinaesthetic imagery in a vision condition.

Hassan Ghrayagh Zandi and Hassan Masomi (2010) conducted a study on “the effect of imagery in soccer players perception of anxiety during penalty kick” The aim of the study was to find out the effect of imagery in soccer players perception of anxiety during penalty kick. For the purpose of the study 40 men soccer players were selected randomly from 200 players. Their age ranged from 18-35 years and they were measured their level of anxiety with SCAI questionnaire. The players followed imagery programme for 10 weeks and 4 days per week. The collected data were analysed with the ‘t’ test. The result of the study shows that imagery practice had positive effect on reduce of anxiety

and imagery practice with kick training had more effect on reduce of anxiety than just kick practice during penalty kick.

Maryam Karimian et al. (2010) conducted a study on “the efficacy of relaxation training and imagery training on self efficacy, competitive anxiety and performance in athletes” The purpose of this study was to find out the efficacy of relaxation training and imagery training (motivational general – mastery imagery) on self efficacy, competitive anxiety and performance in (skate) athletes. For this purpose of the study 75 skate adolescence athletes were selected and they were divided into three groups namely Experimental group I, Experimental group II and control group. Experimental group I underwent relaxation training, Experimental group II underwent imagery training and control group were not applied any training. The subjects were tested on self efficacy, competitive anxiety and performance scales. The collected data were analyzed by using analysis of variance. The results of the study shows that the scores of self efficacy and performance in mental imagery group higher than relaxation training group and relaxation training group higher than control group and the scores of competitive anxiety in relaxation training group lower than mental imagery training group lower than the control group.

Jayachitra, (2010) conducted a study on “Effects of Specific Pre-Competitive training packages with and without psych up strategy on motor fitness, physiological, psychological variables and playing ability among state level basketball players”. The objective of this study was to find out the effects of Specific Pre-Competitive training packages with and without psych up strategy on motor fitness, physiological, psychological variables and playing ability among state level basketball players. For this

purpose three groups of ten female state level basketball players in each were randomly selected and named psych up group, non psych up strategy group and control group. Psych up group was given the psych up strategy along with the basketball training during the pre competitive phase. Non psych up group was given basketball training alone during the pre competitive phase. The control group was not exposed to any training. The data were collected first at the beginning (Pre- test) and finally at the end of the experimental period of ten weeks (Post –test). The study was aimed to find out the influence of training on selected dependent variables on motor fitness, physiological, psychological variables and playing ability. The collected data were analyzed by univariate ANCOVA and post hoc test. The results of the study shows that the psych up strategy and non psych up strategy groups had improved the selected variables and significant difference was existed between the experimental groups, whereas control group had significantly insignificant as they were not subjected to any specific training.

Chitra Dhiman and Harneet Shallu Bedi (2010) investigated a study on “Effect of autogenic training and mental imagery on the trait anxiety of the hockey players” The present research investigation was an attempt to enhance the performance of the hockey players by regulating their trait anxiety level through implementing autogenic training and mental imagery. Pre- and post-test design was used for this purpose. For this study 31 hockey players were selected as subjects from Netaji Subhas National Institute of Sports, Patiala. Before Pre test and after Post test the trait anxiety was measured by the trait anxiety test (Spielberger 1973) was used. The collected data were analysed by using ‘t’ test. The results of the study revealed that the trait anxiety of the hockey players was significantly reduced, in post-test condition as compared to the

pretest condition. It was concluded that the concerned coaches had observed improvement in the performance of the hockey players.

Hassan Sadeghi et al. (2010) conducted a study on “The Mental Skills Training of University Soccer Players” The purpose of this study was to identify the kind of mental skills training needed most by the university soccer players. For the purpose eight male university football players and their aged ranged between 25 to 36 years were selected as subjects from one large university in Kuala Lumpur. All the subjects are having 10 years of playing experience. All of them have signed the informed consent letter to be tape-recorded. The interview transcripts were then hierarchically content analyzed to identify the themes. The results of the study revealed that four themes emerged which are imagery, goal setting, self-talk, and relaxation were the most needed psychological skill training by the respondents.

Navaneethan and Soundararajan (2010) conducted a study on “Effect of Progressive Muscle Relaxation Training on Competitive Anxiety of Male Inter-Collegiate Volleyball Players”. The present study investigated the effect of psychological skill training techniques such as progressive muscle relaxation on competitive anxiety. For this purpose 24 male volleyball players from PSG College of Arts and Science, Coimbatore were selected as subjects. Their age ranged from 18 to 25 years. The Competitive State Anxiety Inventory-2 (CSAI-2), developed by Martens, Vealey, & Burton (1990) were used. Subjects were randomly assigned to either a relaxation training experimental group, or a no relaxation training control group. Both the experimental groups were given training for 3 days a week and for 6 weeks in total. Paired t-tests were used to test the effect of treatment groups individually between pre and post –tests of all

the groups on variables used in the present study. The result of the study reveals that there was significant difference in 0.05 levels of competitive anxiety among the male inter-collegiate volleyball players.

Sathyanandan (2010) conducted a study on "Effect of psychological training on the selected performance related variables in shooting ball game among polytechnic college boys in Andhra Pradesh". To achieve this purpose, 30 male students were selected as subjects from polytechnic college in Andhra Pradesh. Subjects were divided into three equal groups namely experimental group I, experimental group II and control group. Experimental group I named as mental imagery training group consisting of 15 students and Experimental group II named as goal setting training group consisting of 15 students. Group II named as Control group consisted of 15 students. The duration of the training programme was 12 weeks. The data was collected prior and immediately after the training programme. The data was statistically analysed by using analysis of covariance. The results of the study shows that there were significant improvement in the performance of shooting ball players due to the mental imagery training programme and goal setting training programme.

Tod et al. (2009) conducted a study on the effects of instructional and motivational self-talk on performance and the kinematics of the vertical jump. For this purpose 12 men and 12 women were selected as subjects. The subjects were completing a 10 minute warm up on a stationary bike, performed 4 vertical jumps, 3 minutes apart, on a force plate set at a 1000-Hz sampling frequency. Before each trial, participants engaged in 1 of 4 counterbalanced interventions, verbalized out loud, which included motivational self-talk, instructional self-talk, neutral self-talk, or no instruction. The collected data

were analyzed using One-way analysis of variance with repeated measures, followed by paired t-tests with a Bonferroni adjustment. The results of the study showed that both instructional and motivational self-talk led to greater center-of-mass displacement than neutral self-talk. Both instructional and motivational self-talk led to greater impulse than neutral self-talk. Both instructional self-talk (582.6 degrees x s-1) and motivational self-talk led to quicker angular rotation about the knee than neutral self-talk. These results indicate that self-talk leads to greater angular velocity about the knee, thus generating greater impulse and increased jump height-a conjecture that needs empirical testing. Self-talk may contribute to improved performance in sports requiring power-based skills.

Edwards et al. (2008) conducted a study on effects of instructional and motivational self-talk on centre of mass displacement and hip kinematics during the vertical jump. For this purpose twenty four male rugby union players were selected as subjects. Their age ranged from 21-24 years. They were performed three vertical jump tests, with a 2 min rest between jumps. Before each jump, participants engaged in one of three counterbalanced interventions (motivational self-talk, instructional self-talk or no-intervention). The result shows that motivational self-talk led to greater centre of mass displacement than the no-intervention control. Centre of mass displacement did not differ between instructional self-talk and the control condition or between motivational and instructional self-talk. Motivational and instructional self-talk led to greater hip displacement than the no-intervention control. There was also a significant difference in hip displacement between motivational and instructional self-talk, although there was no difference between instructional self-talk and the control condition. Motivational and

instructional self-talk led to greater hip rotation velocity than the no-intervention control, although there was no difference between the two self-talk interventions.

Brooke Castaneda and Rob Gray (2007) conducted a study on “Effects of Focus of Attention on Baseball Batting Performance in Players of Differing Skill Levels”. The purpose of this study addressed the question, what should baseball players focus their attention on while batting? For this purpose Less-skilled and highly skilled (college) baseball players were participated in this study. They were assigned in four dual-task conditions in a baseball batting simulation: directed attention to skill execution, skill/external, directed attention to the environment and environmental/external. The results of the study showed that the batting performance for highly skilled players was best in the environmental/external condition and worst in the skill/internal condition. Performance of less-skilled batters was significantly better in the two skill conditions than in either of the two environmental conditions. It was concluded that the optimal focus of attention for highly skilled batters is one that does not disrupt and permits attention to the perceptual effect of the action, whereas the optimal focus of attention for less-skilled batters is one that allows attention to the step-by-step execution of the swing.

Blakeslee and Goff (2007) conducted a study on “The Effect of a Mental Skills Training Package on Equestrians”. The present study examined the effectiveness of a mental skills training package employing relaxation, imagery, goal setting, and self-talk (strategies for improving performance and perceptions through cognitive-somatic techniques) on equestrian performance. A stratified random sample of 17 competitive collegiate horseback riders were selected as subjects. Among 17 subjects 8 subjects were

selected as mental skill training group and 9 subjects were selected as control group. Riders' goal orientation was also assessed and used to determine if there might be a relationship with performance change over time. Assessment of participants via performance in 2 horse shows revealed no interaction effect for group by time in either flat or show-jumping performance. The results of the study showed that there was a significant main effect of time for performance improvement. Riders demonstrated a dominant mastery-approach goal orientation as hypothesized, but no significant correlations with performance change emerged.

Miyazaki Junichi and Koga Hajime (2007) conducted a study on "Psychological skill training for the Japanese soccer team in 2005 Universiade games in Izmir". For the purpose of the study 20 Japanese university soccer players who are having Psychological competitive ability were examined by original questionnaire and Diagnostic Inventory Psychological Competitive Ability. According to the data obtained from the original questionnaire and interview, those psychological trainings were effective for team building process. Diagnostic Inventory Psychological Competitive Ability. The results shows that the high psychological competitive ability with pre-test 186 points on March 2005, to post-test 192 points on August 2005. The team made great improvement in emotional stability (patience), self confidence, anticipation, and cooperative attitude through the training camps and tournament. It was concluded that the psychological supports from the mental coach such as mental training skills facilitate to enhance team relationship and team performance.

Caterina Pesce et al. (2007) conducted a study on "Focusing of visual attention at rest and during physical exercise in soccer players" The aim of the study was to find out

the focus of visual attention in expert soccer players together with the effects of acute bouts of physical exercise on performance. In this study the discriminative reaction time experiments, which were performed both at rest and under submaximal physical workload, visual attention was cued by means of spatial cues of different size followed by compound stimuli with local and global target features. The results shows that the soccer players were slower than non-athletes in reacting to local compared with global targets, but were faster in switching from local to global attending. And also the results shows that the soccer players appear to be less skilled in local attending, but better able than non-athletes to rapidly “zoom out” the focus of attention. Non-athletes generally showed faster performance under physical load, as expected according to the hypothesis of exercise-induced increases in arousal and/or activation and in resource allocation. It was concluded that the soccer players showed a more differentiated pattern of exercise-induced facilitation that selectively affects specific components of the attentional performance and is interpreted by referring to the role played by individual expertise and cognitive effort.

Ortiz and Grange (2006) conducted a study on “Efficacy of relaxation techniques in increasing sport performance in women golfers” The aim of the study was to determine if progressive relaxation techniques would improve sports performance in a group of female recreational golfers. For this purpose 18 women golfer were selected as subjects. They were divided into two equal groups namely Experimental group I and Control Group. The study was conducted over a 3-month period during which the experimental group regularly engaged in Progressive Relaxation Technique. Both the experimental group and the control group played their regular golf game; recording their scores, putts

per round, and number of greens hit in regulation. Pre intervention measures were recorded and compared with post intervention measures. The results of the study showed that both groups recorded significant improvement on all three measures. The amount of improvement observed for the experimental group was more than that observed for the control group. The between-group differences were not, however, significant.

Robin C. Jackson, Kelly J. Ashford and Glen Norsworthy (2006) conducted a study on “Attentional Focus, Dispositional Reinvestment, and Skilled Motor Performance under Pressure” The aim of the two studies was to examine the Attentional processes governing skilled motor behaviour. For this purpose field hockey and skilled soccer players were selected as subjects. In Experiment 1, field hockey players performed a dribbling task under single-task, dual-task, and skill-focused conditions under both low and high pressure situations. In Experiment 2, skilled soccer players performed a dribbling task under single-task, skill-focused, and process-goal conditions, again under low and high pressure situations. The Results of the study showed that that the detrimental effect of skill-focused attention and the facilitative effect of dual-task conditions on skilled performance. In addition, focusing on movement related process goals was found to adversely affect performance.

Richard et al. (2006) conducted a study on “Using Psychological Skills Training to Develop Soccer Performance” The purpose of the study was to examined the effects of soccer, midfielder-specific psychological skills intervention comprising relaxation, imagery and self-talk on position-specific performance measures. Using a multiple-baseline-across-individuals design, five participants had three performance subcomponents assessed across nine competitive matches. The results of the study

indicated the position-specific intervention to enable at least small improvements on the three dependent variables for each participant. Social validation data indicated all participants to perceive the intervention as being successful and appropriate to their needs. The findings provide further evidence to suggest the efficacy of sport, and position-specific interventions.

Krista J. Munroe Chandler et al. (2005) conducted a study on "Using cognitive general imagery to improve soccer strategies" The purpose of this study was to determine the effectiveness of a cognitive general imagery intervention on three distinct soccer strategies in a young elite female soccer team. For this purpose 13 competitive female soccer players were selected as subjects and their age ranged from 12-14 years. The selected subjects were tested on staggered multiple baseline design across behaviours. The training includes three distinct soccer strategies (defending a direct free kick, taking a direct free kick, and defending a corner kick) which were introduced at 2<sup>nd</sup>, 4<sup>th</sup> and 6<sup>th</sup> week of the training period. The Results of the study indicated that cognitive general and cognitive specific imagery use as well as motivational general-arousal imagery use significantly increased from baseline to post intervention. Findings of the study shows that the execution of soccer strategies was not significantly enhanced with the implementation of a cognitive general intervention.

Eugenio A. Peluso et al. (2005) conducted a study on "A comparison of mental strategies during Athletic skills performance". The purpose of the study was to examine the effects of performance enhancement techniques (PET's) on motor skill performance. For this purpose one hundred fifty college student volunteers (Men = 41; 27.3% and Women = 109; 72.6%) were randomly assigned to one of the nine conditions: Condition

1 and 2, simultaneous, externally verbalized self-talk or imagery (e.g., participants were instructed to say “aim, back, birdie” or engaged in imagery out loud while putting); Condition 3 and 4, delayed externally verbalized self-talk or imagery (e.g., participants were instructed to say “aim, back, birdie” or engaged in imagery out loud before putting); Condition 5 and 6, simultaneous, internally verbalized self-talk or imagery (e.g., participants were instructed to say “aim, back, birdie” or engaged in imagery silently to oneself while putting); Condition 7 and 8, delayed internally verbalized (e.g., participant were instructed to say “aim, back, birdie” or engaged in imagery silently to oneself before putting); and Condition 9, no instruction control group. All participants were asked to perform a golf-putting task. The Result shows that the participants who implemented several (performance enhancement techniques) increased their putting accuracy across overall difference score evaluations when compared to a no instruction control condition. Follow-up analyses indicated that participants who reportedly engaged in ten hours or less of athletic activities per week preferred self-talk strategies whereas participants who endorsed ten hours or more of athletic activity per week preferred imagery strategies.

Claire Calmels and Christelle Berthoumieux (2004) conducted a study on “Effects of an Imagery Training Program on Selective Attention of National Softball Players” The aim of the study was to examined the effectiveness of an imagery training program in improving national softball players' selective attention. For this purpose four participants were selected as subjects. One subjects remained at baseline, while the other three spent 10 min a day practicing an audio-taped imagery program composed of 28 sessions. A multiple-baseline design across individuals was used. They were tested on selective attention via a baseball/softball batting specific version stemming and also they were

tested on Attentional and Interpersonal Style. The results of the study showed that the imagery training program generally enhanced the ability of softball players to integrate external stimuli without being overloaded with them and to narrow attention.

Papaionnou, et al. (2004) Conducted a study on “Combined effect of goal setting and self task in performance of a soccer shooting task”. For the purpose of the study the teams were assigned to one of four conditions : (a) self task, (b) goal setting (c) goal setting plus self task, and (d) do your best control. The Subjects were performed one base line measurement and three experimental sessions. The results showed that performance, compared to the do your best condition in the combined condition is immediately enhanced, whereas self task and goal-setting effects were significant from session-3. no significant difference in differences in performance were observed, among experimental groups, except in session-2, during which the combined group scored significantly better than the goal setting group. It was concluded that both goal setting and self task were effective in enhancing performance.

Chu Min Liao and Richard S.W. Masters (2002) Although it has often been implied that self-focused attention plays a mediating role in performance degradation under stress, the assumption that stress will evoke self-focus has received limited empirical support. Two studies were carried out to explore this relationship. The first study, using a time-to-event paradigm, showed that a higher level of self-focused attention accompanied increased anxiety levels in the build up to competition. In the second study, basketball novices who were instructed to focus on the mechanics of the ball-shooting process during practice suffered a significant performance decrement in a subsequent stressful test phase, whereas those who were required only to do their best

during practice showed no degradation in performance. It was concluded that self-focused attention may increase in response to psychological stress, and that the negative effect of self-focused attention on performance under stress is likely to be magnified by learning the skill under a high degree of self-focused attention, which can result in an over awareness of the performance process .

Marc Jones et al. (2002) conducted a study on “The Impact of Motivational Imagery on the Emotional State and Self-Efficacy Levels of Novice Climbers” This study examined the impact of an imagery script intervention on the levels of perceived stress, self-efficacy and climbing performance of volunteer female participants. Novice climbers were randomly assigned to either a control group, or to an imagery intervention group. Each participant attended four sessions, during which they practiced basic climbing techniques and took part in either a light exercise program (control group) or a scripted imagery training program (experimental group). The imagery script comprised both motivational general-mastery and motivational general-arousal types of imagery. During the testing session the participants climbed a 5.1 meter climbing wall following a designated route. Pre-climb levels of self-efficacy and perceived stress were measured. Perceived stress levels were also assessed on three occasions during the climb itself The experimental group reported significantly lower levels of perceived stress before and during the climb and higher levels of self-efficacy in their ability to execute the correct technique during the climb. There was no significant difference in climbing performance between groups. The results are consistent with the propositions of Martin, Moritz and Hall's (1999) conceptual model of mental imagery use in sport and suggest that motivational general-mastery and motivational general-arousal types of imagery can be

effective in controlling emotions during athletic activity and may also enhance self-efficacy.

Theodorakis et al. (2001) conducted a study on "Self-talk in a basketball-shooting task" This study examined the effectiveness of two different types of self-talk on the performance of a basketball-shooting task. The purpose of this study 60 physical education and sports sciences students were organized into one control and two treatment groups which used self-talk. During the experiment, the control group performed with the general instructions, whereas the self-talk groups used the cue-words "relax" and "fast," respectively. The results showed that only the participants of the self-talk group who used the word "relax" improved their performance significantly as compared to the other two groups. It appears that self-talk.

Kaia et al. (1999) conducted a study on "The Use of Psychological Skills by Female Collegiate Swimmers" The main purpose of the present study was to investigate the use of psychological skills by female collegiate swimmers. A secondary purpose was to investigate use differences between athletes specializing in different swim events. Female collegiate swimmers (N = 147) from ten Midwestern universities were surveyed with a researcher-generated questionnaire, the Athlete's Mental Survey. The means indicated that goal setting, positive self talk, and music for psych-up were the skills found to be utilized "almost always" by the subjects. Also, more than 50% of the sample reported "never" using autohypnosis, autogenic training, blank meditation, bracing, color, cue words, mantra meditation, and Transcendental Meditation (C). The sample was split into two groups including sprinters (n = 105) and long distance swimmers (n = 42). MANOVA showed no significant differences between the skills used by the swimmers

and the distance swam by the athletes. Results are discussed in relation to the need for coaches to educate and encourage athletes' use of psychological skills for performance enhancement.

Kalidasan, (1999) conducted a study on "Influence of training with and without psych-up strategies on selected bio-motor, physiological, psychological and performance variable among cricket players" The purpose of the study was to investigate the influence of field training with and without psych-up strategies on selected Bio-motor, Physiological, Psychological and Performance variable among cricket players. To achieve this purpose, forty two sivaganga district cricketers were randomly selected as subjects. Their age ranged from eighteen to twenty five years. By using matching procedure on the basis of their initial cricket playing ability performance test scores, the subjects were divided into three equal groups of fourteen each. The control group was not exposed to any specific training/ conditioning. The data were collected first at the beginning (Pre- test) and finally at the end of the experimental period of ten weeks (Post -test). The study was aimed to find out the influence of training on selected dependent variables. In addition to that, it had been analyzed if there was any difference between the groups with Psych- up and without Psych-up package on field training programme. The collected data from three groups were statistically analyzed for significant difference if any, by applying the Analysis of Covariance. The result of the study shows that the experimental groups had improved the selected bio-motor, physiological, psychological and performance variable among cricket players and significant difference was existed between the experimental groups. The subjects who had undergone ten weeks of field training with psych-up package (i.e. experimental group 'B') showed noticeable

improvement in Endurance and Strength; and in case of Speed, the improvement was not statistically significant, when compared with experimental group 'A'.

Claudio Robazza and Laura Bortoli (1998) conducted a study on "Mental Preparation Strategies of Olympic Archers during Competition: an exploratory investigation" For this purpose 8 members who participated Italian Olympic archery team were selected as subjects. They were tested on Extensive interview regarding psychological factors associated with excellence and mental preparation strategies adopted during competition. The extensive interview include a variety of mental preparation strategies namely (a) autonomic control (emotion control, somatic control, internal dialogue, and focus on shooting), (b) imagery (visualization, self talk), (c) task focused concentration (body and action control, thought control) and (d) reaction to mistake (focus on correct execution, mistake disregard, shooting analysis). The idiosyncratic nature of the athlete's competition strategies highlights the need of gaining information about the particular demands of the sport and the mental procedures spontaneously developed by the performer, to provide suitable counselling or psychological intervention.

Gershon Tenenbaum et al. (1995) examined a study on "The Effect of cognitive and Somatic Psyching-up techniques on Isokinetic Leg Strength performance". The purpose of the study was to find out the effects of both cognitive and somatic psyching-up techniques on isokinetic strength performance. For the purpose 45 non strength trained men were selected as subjects and their age ranged between 24-27years. They were randomly assigned in to three groups: positive statements (PS-cognitive), relaxation-visualization and autogenic training (RVA-somatic), or control group (no treatment). The

selected subjects were tested on Knee extensor strength before and after four sessions of psychological intervention. The results of the study revealed that the control group showed a significantly greater improvement in peak force than both Positive Statement and Relaxation Visualization and Autogenic training treatment groups. The improvement of peak force observed in Positive Statement was significantly greater than that in Relaxation Visualization and Autogenic training. Peak power improvements were similar for all three groups. It was concluded that the four sessions of mental techniques in non strength trained individuals may hinder optimal strength performance by diverting the individuals full concentration away from the exercise movement.

Tenenbaum et al. (1995) conducted this study to compared the effects of both cognitive and somatic psyching-up techniques on isokinetic strength performance. For this purpose 45 non strength trained men were selected as subjects and their age ranged from 24 – 27 years. They were randomly assigned to one of three groups: positive statements, relaxation visualization and autogenic training, or control group. They were tested on knee extensor strength by kinetic dynamometer before and after four sessions of psychological intervention. The result of the study shows that the control group showed a significantly greater improvement in peak force than both Positive statements and relaxation visualization treatment groups. The improvement of peak force observed in Positive statements was significantly greater than that in relaxation visualization. Peak power improvements were similar for all three groups. The results suggest that four sessions of mental preparation techniques in non strength trained individuals may hinder optimal strength performance by diverting the individuals' full concentration away from the exercise movement.

Daw and Burton (1994) conducted a study on "Evaluation of a comprehensive psychological skills training program for collegiate tennis players". The aim of this study is to find out the impact of a comprehensive psychological skills training for tennis program on collegiate tennis players. For this purpose 24 tennis players were selected as subjects. Program effectiveness was evaluated through (a) case study analyses, (b) intra team analyses comparing high- and low-commitment psychological skills training for tennis players, and (c) inter team analyses comparing psychological skills training for tennis ( $n = 12$ ) and non- psychological skills training for tennis ( $n = 12$ ) players. Psychological skills training for tennis players were exposed to three psychological skills (goal setting, imagery, and arousal regulation) and then given the opportunity to develop individualized psychological skills training for tennis programs. The Result of the study shows that the psychological skills training for tennis program was successful, with case studies providing strong support for the effectiveness of individual psychological skills training for tennis programs. Additionally, intra team results revealed that all psychological skills training for tennis players felt their psychological skills training for tennis program helped their tennis games, although high- and low-commitment players differed significantly on only 2 of 15 psychological and performance variables.

Jill Salmon et al. (1994) Conducted a study of "The use of imagery by soccer players" The purpose of this study was to investigate the motivational and cognitive use of imagery by soccer players of various skill levels. 362 players at the national, provincial and local levels were selected as subjects. The subjects were examined employed in Imagery Use Questionnaire for Soccer Players (IUQ-SP). The items examined when players use imagery and whether or not it is used to assist with game strategies,

individual skills, motivation levels and goal-oriented responses. The results from the questionnaire indicated that soccer players tended to use imagery more in conjunction with competition than training. Players also reported using imagery more for its motivation function than its cognitive function. It was concluded that the elite athletes reported employing more imagery than non-elite athletes regardless of the function imagery served.

Andrea Blair, Craig Hall and Glynn Leyshon (1993) conducted a study on "Imagery effects on the performance of skilled and novice soccer players" The purpose of this study was to investigate the effect of an imagery training programme on the performance of a soccer task by skilled and novice players. For this purpose 22 skilled and 22 novice players were selected and randomly assigned to either a control or an experimental group. The experimental group was given an imagery training programme consisting of both visual and kinaesthetic imagery, and in which both internal and external imagery perspectives were included. They were tested on the performance on the soccer task. The training programme lasted for 6 weeks, with the subjects attending bi-weekly sessions of approximately 15 min each. The control group developed a competitive strategy that was totally unrelated to the performance task. Similar to the experimental group, the controls did this over a 6 week period, attending bi-weekly sessions of 15 min duration. Two performance measures were recorded response time (the time to complete the soccer task) and performance accuracy (errors in performing the soccer task recorded in the form of time penalties) after the training period. The result shows that the performance on the posttest as measured by response time revealed a significant improvement for both the skilled and novice players in the imagery group.

The control group failed to show any such improvement and no effects were found for performance accuracy.

Dagrou et al. (1992) conducted a study on “The effects of positive, negative and neutral self-talk on motor performance”. For the purpose of the study Forty six male and female college students from the Ivory Coast were randomly assigned to two experimental groups (N = 15 for each) and one control group (N = 16). All subjects completed 5 blocs of 10 trials of a dart throw on a 45-cm by 45-cm target. The distance from the center of the target was recorded by measuring the distance along the x and y axes. Subjects in one experimental group (positive verbalizations) were asked to repeat aloud positive verbalizations in between blocs of trials, while subjects in the other experimental group (negative verbalizations) repeated aloud negative verbalizations in between blocs of trials. The control group rested between trials. Results indicated that the angular errors in the positive verbalizations group decreased faster than those of the control group, that the performance of the negative verbalizations group did not improve significantly, and that the rate of angular error in the negative verbalizations group was higher than that of the control group and positive verbalizations groups.

Gail Kendall et al. (1990) examined a study on “The Effects of an Imagery Rehearsal, Relaxation, and Self-Talk Package on Basketball Game Performance” The aim of the study was to investigate the effects of an imagery rehearsal, relaxation, and self-talk package on the performance of a specific defensive basketball skill during competition. For this purpose four female intercollegiate basketball players were selected as subjects. The subjects were evaluated on a single-subject multiple baseline across individuals design. The result of the study shows that the intervention package was

clearly effective in enhancing a basketball skill during games, and social validity measures were very positive.

Hall, Rodger and Barr (1990) investigated a study on "The use of imagery by athletes in selected sports". For this purpose 381 male and female participants from six sports were selected as subjects. The sample comprised competitors in the sports of football, ice hockey, soccer, squash, gymnastics, and figure skating. The subjects were assessed by administering a 37-item questionnaire regarding the use of imagery in their respective sports. As the result athletes reported using imagery more in conjunction with competition than with practice. The motivational function of imagery was found to be important, but no substantial differences were evident between how athletes employ visual and kinesthetic imagery or how they use internal and external imagery perspectives. Athletes also indicated that they do not have very structured or regular imagery sessions. The level at which athletes were competing was found to influence imagery use. The higher the competitive level, the more often the athletes reported using imagery in practice, in competition, and before an event.

Christina Lee (1990) conducted a study on "Psyching up for a muscular endurance task: Effects of image content on performance and mood state". For this purpose 194 males were selected as subjects. And they were divided in to two groups. In Experimental group I 52 males were assigned randomly and their age ranged between 18-30 years, they undergone task relevant imagery, task irrelevant imagery, or a distraction control procedure before performing an analog task. Experimental group II involved 142 males and their aged ranged between 15-30 years and included assessment of mood state following psyching up. The result of the study shows that the task relevant condition

showed significantly greater improvements over baseline. Again the task relevant group showed significantly greater improvements, which were not related to mood states. Content of mental imagery was crucial in determining its effect on performance.

Hughes (1990) conducted a study on "Implementing psychological skills training program in high school athletics". The purpose of this research was to investigate whether or not psychological skill training skills have been defined. So that an instructor on the secondary school level could successfully implement a psychological skill training program with positive results. For this purpose twenty seven male football and basketball players on the secondary level were selected as subjects. A Psychological Skill Training program of imagery and goal setting was researched to determine if self-confidence and sport skills were improved. The result of the study shows that imagery and goal setting did benefit the enhancement of sport skills and build self-confidence. The study indicates that the skill of imagery was learned in a relatively short period (7-10 days) of time as did the skill of goal setting. Sport skills were enhanced and self-confidence did improve. It was concluded that this research indicates that self-confidence took a much longer time to improve as compared to the other positive results of this study.

James P. Whelan, Catherine C. Epkins and Andrew W. Meyers (1990) conducted a study on "Arousal interventions for athletic performance: Influence of mental preparation and competitive experience". "Psych-up" strategies has been assumed to promote physical arousal which subsequently improves certain athletic performances. The aim of the present experiment that the role of arousal changes in the use of psych-up strategies on a physical strength task and a reaction time-decision task for subjects varying in competitive experience. For this purpose eighty four subjects were selected

and they were reliably divided into high, moderate, or low competitive experience groups and randomly assigned to one of three mental preparation strategies. These strategies, which the subjects employed during a mental preparation period for both tasks, were either: (a) a self-generated arousal strategy, (b) a prescribed arousal strategy, or (c) a placebo-control strategy. One trial following a 45 seconds mental preparation period and one trial following a 45 seconds distraction interval. Order of presentation of tasks and order of presentation of distraction and mental preparation trials were counterbalanced and statistically analyzed. The result of the study shows that the utility of different mental preparation strategies for increasing strength performance, but not reaction time-decision performance, for subjects with moderate and high levels of previous competitive experience. Self-generated arousal strategies enhanced performance of moderate experienced subjects. Mental preparation strategies improved athletes' performance on certain tasks, however these strategies do not necessarily achieve their effects through increased autonomic arousal.

Lee Tynes and Robert McFatter (1987) examined a study on "The efficacy of "psyching" strategies on a weight-lifting task". For this study thirty six experienced weight lifters were selected as subjects and they were executed a weight-lifting task under each of four mental preparation conditions as well as two control conditions. The study employed a counterbalanced  $4 \times 4$  Latin square design, and the four mental preparation, or "psyching," conditions included self-efficacy, attentional focus, imagery, and preparatory arousal. The results indicated that the subjects performed significantly better when allowed to engage in mental preparation than when engaging in cognitive distraction. In addition, the preparatory arousal condition was associated with significant

improvement in performance over the control conditions. Preparatory arousal was also significantly more effective than the other three psyching strategies. These findings were interpreted as evidence that preparatory arousal cognitive preparation strategies may be the most effective in facilitating maximum performance in experienced athletes executing a weight lifting task.

Stuart and Biddle (1985) conducted a study on "Mental preparation, mental practice and strength tasks: A need for clarification" Mental preparation has long been thought of as an important aspect of physical performance, especially in tasks requiring muscular strength. Recent studies in sport psychology have addressed this issue, mainly through the investigation of 'psych-up' strategies and effects. The overall trend in such experiments supports the use of mental preparation strategies for strength tasks, but the evidence is less clear for other types of activities. A recent review on mental practice by Feltz and Landers (1983) employed a 'meta-analysis' technique to analyze the statistical trends in 60 studies of mental practice. They compared the 'effect sizes' for mental practice on cognitive, motor and strength tasks and reported a significantly larger effect size for cognitive tasks than for the others and only a small effect size for strength tasks. This suggests that mental practice is less effective in strength activities and thus appears to question the evidence reported in the 'psych-up' literature.

Robert L. Woolfolk, Mark W. Parrish and Shane M. Murphy (1985) conducted a study on "The effects of positive and negative imagery on motor skill performance". The aim of the study was to carried out into the effect of imagery instructions on a simple motor skill accuracy task. For this purpose thirty college students were selected as subjects and they were tested on their putting ability and randomly assigned into one of

three experimental conditions: (a) positive imagery, (b) negative imagery, and (c) control. The subjects in the two imagery conditions were given the identical instructions for imagining the backswing and putting stroke. In the positive imagery group, subjects imagined the ball going into the cup, while subjects using negative imagery visualized the ball narrowly missing the cup. Subjects in the control group putted without instructions. On each of 6 consecutive days a 10-putt trial was conducted for each subject. All the collected data were analyzed through analysis of variance followed by post hoc test. The result of the study shows that there was a significant main effect on performance improvement for the experimental manipulation. Post hoc analyses showed significant differences among all groups, with positive imagery producing the most improvement, the control condition producing less, and negative imagery resulting in performance deterioration.

Robert et al. (1983) conducted a study on "Mental preparation strategies and performance: Is a combination of techniques better than a single technique" The purpose of this investigation was to determine whether combining two mental preparation strategies would be more effective in enhancing performances than a single strategy. For this purpose 40 subjects were practiced on a basketball free throw task (20 shots) using one of the following mental preparation strategies: (a) imagery, (b) relaxation, (c) relaxation plus imagery, (d) placebo control. To simulate game conditions, subjects were allowed only 10 s in which to use their mental preparation strategy. After the practice session, subjects shot 20 test free throws using their designated technique. The Results indicated that there was a significant main effect with the imagery group performing significantly better than the placebo control group although there were no specific

differences between the three experimental groups. The results of the study discussed in terms of potential variables mediating the effectiveness of imagery in enhancing sport performance.

Robert S. Weinberg, Thomas G. Seabourne and Allen W. Jackson (1981) conducted a study on "Effects of Visuo motor Behavior Rehearsal, Relaxation, and Imagery on Karate Performance" The aim of the present study was to determine whether imagery combined with relaxation is more effective in facilitating karate performance than either imagery or relaxation alone. For the purpose of this study 32 karate performers were selected as subjects. And they were randomly assigned to Visuo motor Behavior Rehearsal, relaxation, imagery, or attention-placebo control condition in a one-way design. During the first day of the karate class, each group was individually provided with an explanation of how to practice their assigned strategy at home. The subjects were tested on Trait anxiety tests at the beginning and the end of the 6-week test period. In addition, performance tests were administered at the end of the testing period along with pre competitive state anxiety. The results of the study shows that all subjects displayed a reduction in trait anxiety over the course of the testing period, also the results indicated that the Visuo motor Behavior Rehearsal and relaxation groups exhibited lower levels of state anxiety than the imagery and attention-control groups. Performance was broken down into three subareas which consisted of skill, combinations, and sparring. Results only showed an effect for sparring, with Visuo motor Behavior Rehearsal group exhibiting better performance than all other groups.

Daniel Gould and Allen W. Jackson (1980) conducted a study on "Mental Preparation Strategies, Cognitions, and Strength Performance". Two experiments were

conducted to determine if different mental preparation strategies produced differential strength performance and whether arousal was the major mediating variable explicating this relationship. For this purpose 15 male and 15 female subjects were selected as subjects. They were performed under five different mental preparation conditions in a 2 x 5 Latin square design. The mental preparation conditions included: attentional focus, imagery, preparatory arousal, a control-rest condition, and a counting backwards cognitive-distraction condition. After employing each technique, all subjects were performed four trials on a leg-strength task, and measures of state anxiety and other cognitions were then obtained. The results of the study showed that the preparatory arousal and imagery techniques produced the greatest change in performance, with preparatory arousal subjects also reporting the greatest changes in cognitive states.

Gould, Weinberg and Jackson (1980) conducted a study on "Mental Strategies, Cognitions and Strength Performance" This study report two experiments. For the purpose 30 undergraduates selects as subjects and they were tested on an exercise instrument designed to measure leg strength. Each subject was tested under five different instructional sets: attentional focus (concentrating on feeling in the legs), imagery (mental Practice), Preparatory arousal (emotional "charging up"). Rest control and counting backwards. The instructions for the imagery set, the condition of interest to us, were as follow:...close your eyes and picture yourself kicking your leg up as hard and as fast as possible, like you were kicking a football. In addition, visualize yourself setting a new personal best on each trial". Subjects were given test trails for each condition in counter balanced orders. The result of the study shows that the preparatory arousal and mental practice conditions were not significantly different from each other, but both were

significantly better than the other three conditions. The second experiment, rather than having instructional set as a repeated measure, randomly assigned subjects to one of three conditions: preparatory arousal, mental practice and a rest control. Otherwise the procedure was the same as in the first experiment. These results showed that subjects in control condition. The difference for the mental practice condition was not statistically significant, but the effect size was moderate and similar to that for the preparatory arousal condition in sum, then, this study found support for mental practice and preparatory arousal in improving leg strength.

## **2.2 STUDIES ON THE EFFECTS OF TRAINING AND DRILLS**

Bullock et al. (2012) conducted a study on “An integrative test of agility, speed and skill in soccer: Effects of exercise”. The aim of this study was to evaluate the effect of 45min of soccer-specific exercise in the reactive motor skills test; a novel test which measures sprint, passing and reactive agility performance. A repeated-measures design was used to collect performance data. Forty-two high-level amateur male soccer players in the age group of 18 to 21 were recruited. Participants were familiarised with the reactive motor skills test prior to initial testing. Participants undertook 10 repetitions of the reactive motor skills test before and after 45min of soccer-specific exercise using the Loughborough Intermittent Shuttle Test. Eighteen of these participants repeated the reactive motor skills test for test re-test reliability determination. Paired t-tests and effect size statistics were used to determine the effect of 45min of intermittent exercise on reactive motor skills test performance. Reliability was assessed using the standard error of measurement. The exercise protocol resulted in moderate decreases of sprint and reactive agility performance, but improved passing task time

and passing accuracy. Change in total test time was trivial. Soccer-specific exercise decreased sprint and reactive agility performance but improved technical skill performance on a novel, integrative and reliable test of soccer skill performance.

Maniazhagu (2012) conducted a study on “Effects of SAQ training and Small sided games on speed and agility among junior soccer players” the aim of the study was to find out the effects of SAQ training and Small sided games on speed and agility among junior soccer players. For this purpose forty five junior soccer players were selected as subjects and their age ranged from 15 to 17 years. They were divided into three equal groups namely Experimental group I, experimental group II and control group. Experimental group I underwent SAQ training and Experimental group II underwent Small sided games and control group was not given any specific training. The following criterion variables were chosen namely speed and agility. The criterion variables were assessed before and after the training period of 12 weeks. The analysis of covariance was used to determine if any significant difference was present among the three groups of the dependent variables. The study revealed that the selected fitness variables were significantly improved due to the influence of SAQ training and small sided games practice among junior soccer players.

Chandrasekaran et al. (2012) conducted a study of selective motor fitness components empowers on playing ability among low and high performers of state level football players. To achieve this study, One hundred and fifty men Football players were randomly selected as subjects from Tamilnadu State level men Football Tournament held at Chennai in 2008-09. Their age ranged from 20 to 25 years. Selected subjects were classified into three equal groups of each fifty members. Group I served as -Chennai

Team, Group-II as Salem and Coimbatore Team and Group III Trichy and Madurai Team. All the subjects were oriented the purpose of the test and procedure of conducting this test. Regular activities and training were given that aplomb the player's ability to perform the game. Questionnaire preparation was also done by the Research Scholar with the reference to the review of the literature. The investigator has provided onto the following selected motor fitness variables such as Cardio-vascular Endurance, Speed, Agility and Explosive Power. Resulting data will be collected before and after the competition and statistically analyzed using ANOVA and DMRT. Hence the study concluded that playing ability solely depends on the physical fitness, stress free mind more than that it relates the socio-economic status to perform the better strategy of playing games.

Natarajan and Vijayaragavan (2011) conducted a study on "Prediction of handball playing ability from selected psychological variables among college level men handball players". The purpose of the study was to predict the handball playing ability from selected psychological variables among college level handball players. To achieve the purpose of the study, the investigator selected 100 college handball players from different colleges. In this study the handball playing ability was predicted from 100 college handball players with the help of selected predictor variables namely psychological variables such as anxiety, aggression, achievement motivation and self confidence. The handball playing ability was determined by subjective rating by 3 experts and was use as the criterion variables. The backward multiple regression method was used to determine the prediction equation. Based on the limitation and delimitation of the present research

study, it was concluded that the handball playing ability could be best predicted from psychological variables.

Daniel Juarez et al. (2011) examined a study on “The acute effects of endurance exercise on jumping and kicking performance in young soccer players”. Twenty one top class young soccer players were performed a counter movement jump test and a maximal instep soccer kick test before and after running for 20 minutes on a treadmill at 80% of their individual maximum heart rate. Two force platforms were used to obtain the following parameters during the counter movement jump: jump height, maximum power, maximum power relative to body mass, maximum vertical ground reaction force, maximum vertical ground reaction force relative to body mass and maximum vertical ground reaction force applied to each leg. Maximum vertical ground reaction force and maximum vertical ground reaction force relative to body mass applied to the support leg during the kicks were also calculated with a force platform. The kicking motion was recorded using a three-dimensional motion-capture system. Maximum velocity of the ball, maximum linear velocity of the toe, ankle, knee and hip, and linear velocity of the toe at ball contact during the kicks were calculated. The results of the study shows that the non-significant differences were found in the parameters measured during the counter movement jump and also the results shows that the maximal instep soccer kick test before and after running, suggesting that the jumping and kicking performances of top class young soccer players were not significantly affected after 20 min treadmill running at 80% of their individual maximum heart rate.

Muthukumar and Sundaramoorthy (2011) conducted a study on “Influence of specific skill training package on selected performance variables among inter collegiate

soccer players” The purpose of the study was to examine the influence of specific skill training package on selected performance variables among inter collegiate soccer players. To achieve this purpose 30 men players studying in the department of physical education, H.H. The Rajah’s College, Pudukottai, were selected as subjects. Their age ranged between 18 to 24 years. The groups were divided into two equal groups, namely experimental group and control group. The experimental group underwent selected drills related with the performance of football playing abilities for three days per week for twelve weeks including their regular activities, where as the control group did not expose any special training programme schedule. Kicking ability and shooting drills were considered for designing training for the study. The analysis of covariance was used to analyze and interpret the results of the study. The results of the study showed that there was a significant difference drill training group and control group on selected criterion variables such as passing ability and kicking ability. And also it was found that there was a significant improvement on selected criterion variables due to drill training. It may be due to the nature of the training.

Matt Spencer et al. (2011) conducted a study on “Fitness Determinants of Repeated-Sprint Ability in Highly Trained Youth Football Players” The aim of the study was to investigate the relationships between repeated-sprint ability and other fundamental fitness qualities of acceleration, agility, explosive leg power, and aerobic conditioning through the age groups of U11 to U18 in highly trained junior football players. For the purpose 119 male players were selected as subjects and the age groups completed a fitness assessment battery over two testing sessions. The first session consisted of countermovement jumps without and with arm swing, 15-m sprint run, 15-m agility run,

and the 20-m Shuttle Run (U11 to U15) or the Yo-Yo Intermittent Recovery Test, Level 1 (U16 to U18). The players were tested for repeated-sprint ability in the second testing session using a protocol of  $6 \times 30\text{-m}$  sprints on 30 s with an active recovery. The correlations of repeated-sprint ability with the assorted fitness tests varied considerably between the age groups, especially for agility and explosive leg power. Correlations of repeated sprint ability with acceleration and aerobic conditioning were less variable with age. Repeated-sprint ability associates differently with other fundamental fitness tests throughout the teenage years in highly trained football players, although stabilization of these relationships occurs by the age of 18 years.

Pui Lam Wong et al. (2011) conducted a study on “Validity of the Yo-Yo intermittent endurance test in young soccer players”. The main aim of this study was to find out the criterion and construct validities of the test in young soccer players. A secondary aim was to find out the possible shared variance of the Yo-Yo intermittent endurance test with other physical capacities. For this purpose of the study Sixty two soccer players from an Under-14 team and their age ranged between 12 – 14 years were selected as subjects. All players performed a battery of fitness tests to assess  $VO_{2\max}$ , aerobic endurance performance (Yo-Yo intermittent endurance test), soccer dribbling endurance performance, and power performance (maximal vertical jump, 30-m sprint with 10-m split time). The Results of the study shows that the Yo-Yo intermittent endurance test was strongly correlated with  $VO_{2\max}$ , thereby showing the test's criterion validity. And also the results shows that the players with the best performance on the Yo-Yo intermittent endurance test had significantly higher in  $VO_{2\max}$ , and significantly better in soccer dribbling endurance and 30-m sprint times. Logistic regression showed that

Hoff dribbling test performance,  $VO_{2max}$  and 30-m sprint time were significant independent parameters contributing to performance on the Yo-Yo intermittent endurance test. It was concluded that the Yo-Yo intermittent endurance test is a valid on-field aerobic endurance performance test for young soccer players, which can also be used to differentiate the maximal aerobic capacity, soccer dribbling endurance, and 30-m sprint performance of these players.

Mirkov DM et al. (2010) conducted a study on “Development of anthropometric and physical performance profiles of young elite male soccer players: a longitudinal study” The purpose of the present longitudinal study was to explore distinctive anthropometric and physical performance characteristics of young soccer players between the age of 11 and 14 and to reveal the performance at the age of 11, which contributes to the later success. For this purpose twenty six male players of the best national male squads of the 'cadet league' were annually tested starting from the age of 11 for body size and composition, flexibility, power, coordination, and agility. Randomly selected sixty three untrained but physically active age-matched boys were also tested over 4 consecutive years. The results revealed no difference between 2 groups regarding the body size and composition. The differences in flexibility emerged only at the later age, whereas the differences regarding the explosive power (as assessed by various jumps) were moderate and partly inconsistent. The most prominent advantage of the soccer players over the control subjects during the entire tested age period appeared to be movement agility and coordination.

Barbara C. H. Huijgen et al. (2010) conducted a study on “Development of dribbling in talented youth soccer players aged 12–19 years” The purpose of the study

was to assess the development and determine the underlying mechanisms of sprinting and dribbling needed to compete at the highest level in youth soccer. For this purpose 267 talented soccer players were selected as subjects and their age ranged between 12–19 years. The subjects were measured on a yearly basis in a longitudinal study over 7 years, resulting in 519 measurements. The tests consist of two field tests namely the Shuttle Sprint and Dribble Test and the Slalom Sprint and Dribble Test. And also they were measured on anthropometric characteristics, years of soccer experience, and duration of practice. The collected data were analysed with multi-level modelling. The observed data indicated that each test measures distinct qualities. Low to moderate correlations were found between dribbling and sprinting within each test. The result of the study shows that the both dribbling and sprinting improved with age, especially from ages 12 to 14, but the tempo of development was different. From ages 14 to 16, sprinting improved rapidly in contrast to dribbling; this was especially evident on the Slalom Sprint and Dribble Test. In contrast, after age 16 dribbling improved considerably but sprinting hardly improved. Besides age, the factors that contribute to dribbling performance are lean body mass, hours of practice, and playing position.

Wong, Chamari and Wisloff (2010) conducted a study on “Effects of 12-week on-field combined strength and power training on physical performance among U-14 young soccer players” The purpose of the study was to examined the effects of on-field combined strength and power training on physical performance among U-14 young soccer players. Fifty one football players were selected as subjects and they were assigned to experimental (EG, n = 28) and control groups (CG, n = 23). Both groups underwent preseason soccer training for 12 weeks. Experimental Group performed

combined strength and power training twice a week, which consisted of strength and power exercises that trained the major muscles of the core, upper, and lower body. Combined strength and power training significantly improved vertical jump height, ball-shooting speed, 10 m and 30 m sprint times, Yo-Yo intermittent endurance run, and reduced submaximal running cost. Combined strength and power training had moderate effect on vertical jump, ball-shooting, 30 m sprint, and Yo-Yo intermittent endurance run, small effect on 10 m sprint, running cost, and maximal oxygen uptake. Yo-Yo intermittent endurance run had significant correlations with 10 m and 30 m sprint times, ball-shooting speed, and vertical jump. The combined strength and power training can be performed together with soccer training with no concomitant interference on aerobic capacity and with improved explosive performances.

Athanasios Katis and Eleftherios Kellis (2009) examined a study on “Effects of small-sided games on physical conditioning and performance in young soccer players” The purpose of this study was to examine, first, the movement actions performed during two different small-sided games and, second, their effects on a series of field endurance and technical tests. For this purpose thirty four young soccer players participated in the study. Small-sided games included three-a-side (3 versus 3 players) and six-a-side (6 versus 6 players) games consisting of 10 bouts of 4 min duration with 3 min active recovery between bouts. Soccer player performance was evaluated using five field tests: a) 30m sprint, b) throw-in for distance, c) Illinois Agility Test, d) dribbling the ball and e) horizontal jump before, in the middle and after the implementation of both game situations. Heart rate was monitored during the entire testing session. Each game was also filmed to measure soccer movements within the game. The collected data were analyzed

using ANOVA. The result of the study shows that the three-a-side games displayed significantly higher heart rate values compared with the six-a-side games. The number of short passes, kicks, tackles, dribbles and scoring goals were significantly higher during the three-a-side compared with the six-a-side game condition while players performed more long passes and headed the ball more often during the six-a-side. After the three-a-side games, there was a significant decline in sprint and agility performance, while after both game conditions significant alterations in the throw-in and the horizontal jump performance were observed. The results of the study indicated that three-a-side games provide higher stimulus for physical conditioning and technical improvement than six-a-side games and their use for training young soccer players is recommended.

Stone and Oliver (2009) conducted a study on “The effect of 45 minutes of soccer-specific exercise on the performance of soccer skills”. The aim of the study was to examine the performance of soccer shooting and dribbling skill. For this purpose nine semi professional soccer players were selected as subjects and their age ranged from 19 – 21 years. The subjects were completed a slalom dribble test and the Loughborough Soccer Shooting Test, before and directly following the performance of three 15-min bouts of a modified version of the Loughborough Intermittent Shuttle Test. The result shows that the Loughborough Intermittent Shuttle Test slalom dribbling time increased significantly due to 45 minutes of soccer specific exercise and the mean total points scored during the Loughborough Soccer Shooting Test was significantly increased.

Castagna et al. (2009) conducted a study on “Effects of intermittent-endurance fitness on match performance in young male soccer players”. The purpose of this study was to examine the effect of specific endurance (Yo-Yo Intermittent recovery test level 1,

Yo-Yo IR1) on match performance in male youth soccer. For this purpose twenty one young, male soccer players were selected as subjects and their age ranged between 14 to 16 years were involved in the study. Players were observed during international championship games of corresponding age categories and completed the Yo-Yo IR1 on a separate occasion. Physical (distance coverage) and physiological match demands were assessed using Global Positioning System technology and heart rate short-range telemetry, respectively. During the match, players covered 6,204 +/- 731 m, of which 985 +/- 362 m (16%) were performed at high intensities. The result shows that there was a significant decrement in match coverage was evident during the second half. No significant difference between halves was observed for HIA and sprint distances. During the first and second halves, players attained the 86 +/- 5.5 and 85 +/- 6.0% of HRmax, respectively. Peak heart rate during the first and second halves were 100 +/- 4 and 99.4 +/- 4.7% of HRmax, respectively. Yo-Yo IR1 performance was significantly related to match HIA and total distance. The result of the study shows that the specific endurance, as determined by Yo-Yo IR1 performance, positively affects physical match performance in male young soccer players. Consequently, the Yo-Yo IR1 test may be regarded as a valid test to assess game readiness and guide training prescription in male youth soccer players.

Nunez et al. (2008) conducted a study on "Effects of training exercises for the development of strength and endurance in soccer" The Purpose of this study was to find out the development of strength and endurance in soccer. For this purpose 16 professional soccer players from Spain with a mean age of 28 +/- 3.37 years were selected as subjects. A training program designed to increase strength and aerobic endurance in 1 season. The

schedule comprised 4 macrocycles of 12 weeks of aerobic endurance and strength training. As much for the strength training as for the aerobic endurance, the program used a sequence of general, special, and specific exercises. Assessments were made with routine tests (i.e., squat jumps, countermovement jumps, and countermovement jumps with arm swing at the end of each macrocycle, and the Probst test was used to assess aerobic endurance as a function of running speed and distance, at the start and end of the training schedule and at the start of the third macrocycle. Jumps were performed on an infrared platform fitted to the Muscle Lab system. The Probst test showed differences between the first evaluation and the second and third evaluations. For 2 of the 3 jumps analyzed, the results were better in the last 2 than in the first 2 evaluations. Improvement of aerobic endurance was produced on the first phase of the season as a consequence of the training. To increase strength, it is necessary to augment the number of training sessions of this type. It is convenient to separate aerobic endurance and strength training to create more ample blocks during the last 2 macrocycles.

Holt and Lambourne (2008) Conducted a study on “The impact of different warm-up protocols on vertical jump performance in male collegiate athletes” The purpose of this study was to compare the impact of different types of warm-up on countermovement vertical jump performance. Sixty-four male Division I collegiate football players completed a pre test for Vertical Jump height. The participants were then randomly assigned to a warm-up only condition, a warm-up plus static stretching condition, a warm-up plus dynamic stretching condition, or a warm-up plus dynamic flexibility condition. Vertical Jump performance was tested immediately after the completion of the warm-up. The results showed that there was a significant difference

( $P < .05$ ) in Vertical Jump performance between the warm-up groups. Post test jump performance improved in all groups; however, the mean for the static stretching group was significantly lower than the means for the other 3 groups. The static stretching negated the benefits gained from a general warm-up when performed immediately before a Vertical Jump test.

Jenny, Krista and Munroe Chandler (2008) conducted a study on “The Effects of Image Speed on the Performance of a Soccer Task”. The aim of the study was to examining the effects of 3 imagery conditions on the performance of a soccer dribbling task. The imagery conditions were also compared with physical-practice and control-group performance. For this purpose ninety seven participants were randomly selected and assigned into 5 conditions: real-time imagery, slow-motion imagery, slow motion concluded with real-time imagery, physical practice, or control. The result of the study indicated that all 4 experimental groups significantly improved time and error performance to the same degree after the intervention. The control group significantly improved time but not error performance from pre- to post intervention.

Ercan Gur et al. (2007) investigated a study on “Effects of technical training on skill development in non-dominant legs of young soccer players” The purpose of this study was to investigate the effect of special technical training on the skill development in non-dominant legs of young soccer players of two different age groups. For this purpose 65 volunteer soccer players from 4 young soccer teams were selected as subjects. They were randomly assigned in to experimental and control groups and their age ranged between 12–14 years and 16–18 years respectively. They were tested on 7 skill test namely Volley kick, Single Passing Hit, Short Passing Hit, Ball Counting, Short

dribbling, Long dribbling, Johnson Test training period. The training includes Basic ball drills to work only the non-dominant leg were carried out following the warm up for 10 weeks, 3 days/week. The result of the study shows that the development of physical characteristics of experimental and control groups were parallel. There were no significant differences in the non-dominant legs of the both control groups but except the ball counting skill in 16-18 age groups there were significant differences in the non-dominant legs of experimental groups in the skill development of levels. It was concluded that there was much more skill development in the experimental group of 12–14 years than the experimental group of 16-18 years.

Johnson Premkumar and Mariayyah (2007) conducted a study on “Effect of Selected Hathayogic Practices in Enhancing Kicking Ability in Soccer Playing” The objective of the present study was to analyze the effect of selected yogic practices in enhancing the kicking ability among the men soccer players. For this purpose thirty men soccer players at the inter-collegiate level were selected at random to be treated under the designed training package to find out the training impacts and outcomes. The selected soccer players underwent twelve weeks of intensive yogic training besides their regular sports training. The kicking ability was measured before and after the treatment by administering the Warner Test of Soccer Skills. The data were analyzed by using ‘t’ ratio for interpretation. The designed training package was suitable and made positive training impacts on kicking ability among the soccer players.

Leszek Cicirko et al. (2007) conducted a study on “General and special physical fitness levels in young football players” The aim of the study was to define the level of general and special physical fitness of football players in the key stage of sports training

– transition from learning to training, and investigate the correlation between general and special fitness of young football players, and their playing position. For this purpose 20 selected football players with 6-year training experience were selected as subjects. The selected subjects were tested on International Fitness Test to evaluate general physical fitness, and Football Abilities Test was used to evaluate special fitness. The collected data were analyzed by Spearman's rate correlation. The result of the study shows that according to the classification of International Fitness Test's norms, the players were placed in the 320 – 480 point brackets that defined their general physical fitness as medium. In the special fitness test the strikers definitely dominated, whereas the defensive players gained the poorest results. This study confirmed the need to conduct similar tests as methods controlling the training effects. It was concluded that the research on the special and general physical fitness confirm interdependence rate and the influence on the level of football player.

Reilly et al. (2007) conducted a study on "Diurnal variation in temperature, mental and physical performance, and tasks specifically related to football". The purpose of the present research, consisting of two separate studies, was to determine whether game-related skills varied with time of day in phase with global markers of both performance and the body clock. For this purpose eight diurnally active male association football players in the age group of 19 to 21 with 12 years of playing experience were selected as subjects. Measurements were made on different days at 08:00, 12:00, 16:00, and 20:00 hours in a counterbalanced manner. Time-of-day changes in intra-aural temperature (used as a marker of the body clock), grip strength, reaction times, flexibility (markers of aspects of performance), juggling and dribbling tasks, and wall-

volley test (football-specific skills) were compared. The results of the study show that there was a Significant (repeated measures analysis of variance, ANOVA) diurnal variations were found for body temperature, choice reaction time, self-rated alertness, fatigue, forward (sit-and-reach) flexibility, and right-hand grip strength, but not left-hand grip strength nor whole-body flexibility. Alertness was highest and fatigue lowest at 20:00 h. Football-specific skills of juggling performance showed significant diurnal variation, whereas performance on the wall-volley test tended to peak at 20:00 h and dribbling showed no time-of-day effect. In a second study, eight diurnally active subjects completed five test sessions, at the same times as in the first study but with a second session at 08:00 h. Test-re-test comparisons at 08:00 h for all components indicated good reliability. Intra-aural temperature showed a significant time-of-day effect with mean temperature at 16:00 h higher than at 08:00 h. There was no significant effect of chronotype on the temperature acrophase (peak time). Diurnal variation was found for performance tests, including sit-and-reach flexibility and spinal hyper-extension. Peaks occurred between 16:00 and 20:00 h and the daytime changes paralleled the temperature rhythm. Diurnal variation was also found for football-specific tests, including dribbling time and chip test performance, being more accurate at 16:00 h than at 08:00 hours. Results indicate football players perform at an optimum between 16:00 and 20:00 hours when not only football-specific skills but also measures of physical performance are at their peak. Body temperature peaked at a similar time, but positive mood states seemed to peak slightly earlier. While causal links cannot be established in these experiments, the results indicate that the diurnal variation of some aspects of football performance is affected by factor(s) other than body temperature alone.

Matheus Fontes et al. (2007) conducted a study on “Intensity of four types of elite soccer training sessions”. For the purpose of the study 10 professional players of a first division Brazilian Soccer club were selected as subjects. They were monitored on Heart Rate during three of each type of training sessions: technical drills, tactical drills, modified games and practice games. HRmax was determined during a field test (3x600m increasing intensity). The collected data were analyzed by using one-way analysis of variance and the differences were identified through Tukey’s post-hoc. The result of the study shows that the players had a mean HRmax of  $192 \pm 11$  bpm and mean AT of  $176 \pm 10$  bpm. The technical drills was significantly less intense than tactical drill, modified games and practice games. No differences were found between tactical drill, modified games and practice games. This study showed that the tactical drill had a lower intensity when compared to the other types of training sessions. It is shows that the modified games would have a higher intensity than the other types of training sessions analyzed.

Vlatko Vucetic et al. (2007) conducted a study on “Muscle strength, kicking and sprinting performance parameters in elite female soccer players”. The objective of this study is to determinant the correlation between kicking and sprinting performance and how strength influence sprinting and kicking performances. For this purpose twenty-four croatian female football team members were selected and their age ranged between 17 – 19 years. They were evaluated on kicking performance with ball velocity after the full-instep kick performance and which was measured by a Stalker Radar Gun, Texas. The result of the study shows that there was no significant correlation between kicking and sprinting performance.

Thiago Santi Maria et al. (2007) examined a study on “Explosive strength performance of under-20 soccer players in different field Positions” The aim of this study was to analyze the explosive strength performance in different positions of backwards, left and right-backs, back middle fields, middle fields and forwards for under-20 soccer players. For the purpose of the study 44 male elite Brazilian soccer players were selected from subjects and they were divided in 5 groups namely backward, left and right backs, back middle fields, middle fields and forwards. They were tested on Explosive strength and elastic explosive. The performances were assessed by contact carpet Jump Test. The collected data were analyzed through the descriptive statistic, one way ANOVA and Post-hoc LSD. The results showed that the existence of inferiority to the performance for left and right-backs explosive strength in relation to middle fields and forwards and also from the middle fields to back middle fields. Also, inferiority was noticed from left and right-backs elastic explosive strength performance and middle fields in relation to back middle fields and forwards. It was concluded that explosive strength is mobilized in different forms to perform high intensity actions depending of soccer player position.

Jaime Sampaio et al. (2007) conducted a study on “Changes in speed, explosive strength and anaerobic power after application of two different training methods in soccer players”. The aim of this study was to assess the effect of the power endurance training method on semi-professional male soccer players. For this purpose forty semi professional Portuguese players were selected and they were divided in two groups namely power endurance training group and continuous training group. The selected subjects were tested on speed, explosive strength and anaerobic power as measured by the 15m and 30m speed tests, the Squat-Jump and Counter Movement Jump and the

Bangsbo Modified Sprint Test. The evaluations were performed during the first training session of the season, six and twelve weeks after the beginning of the training program. Collected data were statistically analyzed using analysis of variance. The result shows that power endurance group was always faster than continuous training group in the 15m, 30m and Bangsbo Modified Sprint Test. Additionally, power endurance group showed higher values than the continuous training group in the Squat Jump and no significant differences were found in the Counter Movement Jump. The results suggested that both training modalities were able to maintain initial values of speed and explosive strength. However, the PEG exhibited higher improvements in anaerobic power.

Miguel Arruda et al. (2007) conducted a study on "Change in physical performance of sub-20 soccer players submitted in maximal strength training program". The aim of the study was to verify the changes in the physical performance of sub-20 soccer players submitted in a six week training program of a maximal strength over the changing of agility and explosive strength performance. For this purpose twenty two Brazilian soccer players, all competed in the 2006 season in the Paulista Juniors Championships, Brazil were selected from subjects. They were tested on squat jump, countermovement, Illinois agility test and maximum strength. The measurements were tested before and after pre season of 6 weeks of the training program of maximum strength. The results showed that the increases in the performance of the maximum strength after the training programme. Observing other variables there were significant increases after the training program in the performance of the variables of explosive strength and agility. There was no significant change for elastic explosive strength, even

indicating increases in its performance. The increase of the maximal strength performance of the muscle results increased over agility.

Jack Majgaard Jensen et al. (2007) conducted a study on “Effect of additional in-season aerobic high-intensity drills on physical fitness of elite football players”. For this purpose sixteen elite soccer players were selected as subjects. The selected subjects carried out additional aerobic high intensity training once a week for 12 weeks. Each session lasted 30 minutes and consisted of small-sided games, organized as interval training with 2-4 min work intervals separated by 1-2 min of rest. All subjects were tested on several physiological tests (Yo-Yo IR2 test, incremental treadmill VO<sub>2</sub>max test, repeated 30-m sprint test). Tests were performed before and after the intervention period. After the intervention period the collected data were analyzed by using analysis of variance. The result of the study shows that the performance of the Yo-Yo IR2 test was improved by 15% and VO<sub>2</sub>max was improved by 5%. The best 30-m sprint time was unaltered after 12 weeks, whereas fatigue time in a repeated sprint test was lowered. Additional high intensity 30-min drills performed once a week markedly improved aerobic power, anaerobic capacity and football-specific intermittent exercise performance of elite football players during the competitive season.

Thomas Little and Alun G. Williams (2006) investigate a study on “Suitability of Soccer Training drills for Endurance Training”. The purpose of this study was to investigate inter subject variability and intra subject reliability in exercise intensity during soccer drills. For the purpose 23 professional soccer players were selected as subjects. The selected subjected were tested on heart rates during a range of soccer training drills. The drills consisted of 2 vs. 2 to 8 vs. 8 normal scoring games and 2 further possession

games. The heart rate responses were examined for variability, reliability, and suitability for soccer endurance training. The collected data were analyzed by t-test. The result of the study shows that no significant differences in heart rate on repetition of the drills and 95% ratio limits of agreement were 1.8–3.8%. There were no significant correlations between exercise intensity and the statistical measures of variability and reliability.

Robert M Malina et al. (2005) conducted a study on “Maturity-associated variation in sport-specific skills of youth soccer players aged 13 – 15 years”. The aim of this study was to estimate the contribution of experience, body size and maturity status to variation in sport-specific skills of adolescent soccer players. Sixty nine players from three clubs that competed in the highest division were selected as subjects. Their age ranged from 13 – 15 years. The subjects were measured on their height and body mass development at clinical examination. Six football skill tests were administered on ball control with the body, ball control with the head, dribbling with a pass, dribbling speed, shooting accuracy and passing accuracy. Multiple linear regression used to estimate the relative contributions of age, stage of sexual maturity, height, body mass and years of formal training in soccer to the six skill tests. The results of the study shows that the age, experience and body size contributed significantly but in different combinations to the variance in four of the six skill tests, dribbling with a pass, ball control with the head, ball control with the body and shooting accuracy. There were no significant predictors for the tests of dribbling speed and passing accuracy. It was concluded that the age, experience, body size and stage of puberty contributed relatively little to variation in performance in four of the six soccer-specific skill tests in adolescent footballers aged 13 – 15 years.

Dupont, Koffi and Serge (2004) conducted the study on "The effects of in-season, high-intensity interval training on professional male soccer players" For the purpose of this study twenty two subjects were selected as subjects. They were undergone 2 consecutive training periods of 10 weeks. The first period was considered a control period and was compared with a period where 2 high-intensity interval training exercises were included in the usual training program. Intermittent runs consisted of 12-15 runs lasting 15 seconds at 120% of maximal aerobic speed alternated with 15 seconds of rest. Sprint repetitions consisted of 12-15 all-out 40-m runs alternated with 30 seconds of rest. The Result of the study shows that the high-intensity interval training have shown that maximal aerobic speed was improved and that the time of the 40-m sprint was decreased, whereas no change in either parameters were observed during the control period. It was concluded that improvements in physical qualities can be made during the in-season period.

Sawyer et al. (2002) conducted a study on "Relationship between football playing ability and selected performance measures" The purpose of this study was to find out the relationships between football playing ability and selected anthropometric and performance measures. For this purpose 40 men football players from NCAA Division I-A were determined as subjects. The subjects were measured on Football playing ability and vertical jump. The results of this study show that football playing ability was significantly correlated with vertical jump in all groups (offense, defense, and position groups of wide receiver-defensive back, offensive linemen-defensive linemen, and running back-tight end-linebacker). Eleven of 50 correlations (groups by variables), or 22%, were important for football playing ability. Five of the 11 relationships were related

to vertical jump. Forward stepwise regression equations for each group explained over half of the criterion variable, football playing ability, as indicated by the  $R^2$  values for each model. Vertical jump was the prime predictor variable in the equations for all groups.

Williford et al. (1994) conducted a study on "Physical and performance characteristics of successful high school football players" The purpose of this investigation was to determine the performance and physiologic characteristics of a "successful" American high school football team, and to compare the present values with values reported for other groups of high school, college, and professional players. For this purposes, players were divided into two groups: backs ( $N = 8$ ) and linemen ( $N = 10$ ). Maximal aerobic power was determined from a maximal treadmill test, and body composition was evaluated by hydrostatic weighing. Maximal strength values were evaluated by 1RM bench press and squat test; the sit-and-reach test for flexibility. Speed and power were evaluated by a vertical jump and a 36.6-meter sprint. Results indicate that compared with other groups of college and professional players, as the level of competition increases so do height, weight, and fat-free weight of the players. Similar maximum oxygen consumption values were found for the present group when compared with other groups of these players. From the strength and power standpoint, football players at all levels are becoming stronger. Incorporation of strength training programs has greatly improved strength and performance profiles of football players at all levels of competition.

McLean and Tumilty (1993) conducted a study on "Left-right asymmetry in two types of soccer kick" The ability to kick with both feet is regarded as a desirable skill in

high level soccer players; however, most players display a dominance of kicking ability on one side. This study investigated the characteristics of asymmetry in two types of soccer kick. A low drive and a chip kick from both the left and right foot of 12 elite junior soccer players were analysed. Kick velocity, kick accuracy, position of the plant foot from the ball centre, and time from foot plant to ball contact were measured for each kick. Knee extension and flexion strength were also determined for each leg at 60 degree s<sup>-1</sup>, 180 degree s<sup>-1</sup> and 240 degrees s<sup>-1</sup> on a Cybex II Isokinetic Dynamometer. A single factor repeated measures analysis of variance was applied to velocity, plant foot position and timing parameters to compare between sides and between shots. chi 2 analysis was used to compare accuracy between shots and between sides, and a paired Student's t test was used to compare strength parameters between sides. The results showed that this group had strength dominance at all speeds tested on the right side and better drive kick performance with their right leg as determined by mean, velocity, versus and accuracy. There was no difference in these parameters between sides for chip kicks.

### **2.3 SUMMARY OF THE LITERATURE**

Above literature shows that there was a significant change in physical fitness, game skill and playing ability due to psych up strategy, training and drills. From the review of related literature, it was found that there was a scope for research in combining specific football drills with psych up strategies on selected physical fitness, game skill and playing ability among inter collegiate football players. Based on the experience gained, the investigator formulated suitable methodology to be adopted in this research, which is presented in chapter-III.