A serious and scholarly attempt has been made by the scholar to go through the related literature. Although literature specified related to the present study but some of the vital and valuable information in support of present study were gathered. A brief review of the studies related to the present problems has been described in this Chapter.

**CRITICAL LITERATURE STUDIES**

Peterson\(^1\) (1980) conducted a study to establish the prediction of basketball performance using psychomotor, cognitive, and anthropometric measure. Female members (N=43) of the top four teams in 1979 Missauri Small College Basketball tournament served as subjects. The contributions of GPA, anaerobic leg power, 15 yards dash, 30 yards dash, total body RT, TRT height and weight to basketball performance were determined. Basketball performance was determined by a specially designated formula by H. K. Kay. Height (r = 0.388) was the only significant (p < 0.05) predictor. The 15 yards dash, total body RT, and power were next. The `R` for the four top variables was 0.56 (p < 0.01).

Toner\(^2\) (1982) investigated the relationship of selected physical fitness and mood variables to success in female high school basketball players. The study examined the relationship of physical fitness, skills and mood variables success in female high school basketball players being chosen to become varsity players. Mc Nair’s profile of Mood
States, Cooper’s 12 minutes run test, AAHPER Jump and Reach test, AAHPER Shuttle run test, 30 yards dash, AAHPER under basketball test, speed dribble test were administered to eighty one female high school basketball players. Each of the three teams was treated on three separate occasions during the regular afternoon practice time for the teams. At the end of the testing and evaluation period, the few of coaches on the basis of their observations during drills and scrimmage competition independently related each candidate as either a successful or an unsuccessful performer. Discriminate analysis procedures supported the following hypothesis (a) The fitness factor, skill testing and personal factors, (known together as pre-season variables) were successful indicators of group membership while the POMS did correlate with coach’s ratings.

Smith³ (1980) conducted a study of the effects of anxiety on shooting proficiency among College Women Basketball players. Members of the 1977-78 South Dakota State University women’s basketball team (N =12) were measured on State Anxiety Inventory (SAI). Sports Competition Anxiety Test (SCAT), Pre-game Hr, Game field goal percentage, game free throw percentage, season field goal percentage and season free throw percentage, SS in group one consisted of players who attempted over 122 field goals during the season while group two attempted 95 field goals or less. Results of ANOVA indicated Significant (p > 0. 05) difference between groups, on season field goal percentage and state anxiety inventory subsequently data analysis throughout this study incorporated only the value from group 1. A significant ‘t’ was found between scores on the SAI and SACT.
Significant ($p > 0.05$) multiple regression equations to estimate field goal shooting proficiency from selected measures of anxiety produced multiple $R$’s ranging from 0.47 to 0.66 and accounted for between 22 and 44 percentage of the variance in performance. A multiple regression equation for predicting free throw success was not significant ($p > 0.05$).

Battles$^4$ (1980) studied the prediction equation for selection of women inter-collegiate basketball team members. The subjects for this investigation were thirty three female who were participating in women’s basketball of three colleges in Florida. Each subject completed a personal data form, the athletic motivational inventory (AMI), the known basketball test, sargent jump test, and field goal speed test. Selected anthropometric measurements were also obtained from each subject. Each head coach and each assistant coach were asked to rank each member of the team in order of how each contributed to team success. Three different team rankings were included in the statistical analysis. The rankings were head coach’s rankings, the assistant coach’s ranking and the average rankings of the head and assistant coaches. Significant correlations 0.05 level were found to exist between the head coaches rankings and age and college basketball experience, and between the average of the head assistant coaches ranking and college basketball experience. Results of step-wise multiple regressions indicated that players ranked high by head coaches tended to score high on a combination of physical and psychological variables. These variables included college basketball experience, height, vertical jump, mental toughness, and the AMI total score. Assistant Coaches tended to select players with high scores on psychological variables which included
interest, responsibility, mental toughness and aggression. The average ranking of the head coach and the assistants favoured players with college basketball experience responsibility, mental toughness, age and self confidence. Mental toughness was the only variable which consistently appeared regardless of the method of ranking.

Hammes\(^5\) (1979) found the relationship of bio-rhythm to selected aspects of basketball performance. In all 13 members were selected from 1976-77 UW-Eau Claire, Green Bay, and La Crosse Men’s Inter-Collegiate Basketball teams who played were evaluated on field goal percentage, free throw percentage, rebounds, assists, blocked shots, turnovers and fouls, completed bio-rhythm charts were computed for the season. A three way ANOVA revealed no significant difference between the player’s game performance and his bio-rhythmic cycles.

Garden\(^6\) (1978) predicated basketball playing ability of college women by selected tests. The purpose of this study was to determine the value of cardio-vascular capacity measure (Cooper’s 12 minutes Run), leg power measure (Modified Sargent Jump, Jump and Reach test) or upper body muscular strength and endurance flexed arm hang, a percentage of body fat measure (Skin fold thickness), and measure of body height as predictors of basketball playing ability and to develop a statistical equation for predicking success in playing college basketball. The basketball playing ability or criterion measures were an ability rating, a personality ability rating, composite ability/personality rating, null comparative rating scale, and a ranking of the players by the coaches. The sample was twenty female basketball players from the 1976-77
University of Arkansas and North Eastern Oklahoma State University teams. Ten players from each school participated in the study.

The step-wise multiple regression programme was utilized to form prediction equations by the five tests or predictor variables being correlated with each of the five basketball playing ability measures. The prediction equations were selected using a criteria only those variables which had the lowest standard error of estimate and the greatest `F` value. The equation produced a correlation coefficient of 0.786 and a standard error of estimate of ± 0.392. The prediction equation form step-wise multiple regression programme was basketball ability = 9.0532 + 1.36421 (12 Minutes Run) – 0.11303 (Height).

Hudson\(^7\) (1985) designed to examine the use of selected biomechanical variables in the prediction of basketball skill. The subjects were college women in three mutually exclusive groups of basketball skills: and elite group of six competitions on the United States team in the World University Games, a good group of seven players on a varsity team, and a poor group of nine members of an instructional class. An accuracy test and digital film records provided the data for 12 variables related to the process or product of free throw shooting. Discriminate analysis was employed to predict the categorical variable of skill. The most discrimination came from variable of accuracy, stability and height of release rather than from variables of projection. Poor shooters were distinguished by instability; elite shooters more characterized by a high point of release and accuracy under pressure. Depending on the method of prediction, rates for correct classification of
subjects ranged from 76 to 100 percentages. Thus it appears that discriminate analysis using bio-mechanical variables can be successful in the prediction of basketball skill.

Holland\(^8\) (1964) conducted a study to determine the value of speed, agility, upper-arm strength, power, ball handling ability, reaction, shooting ability, passing ability, height, weight, age and previous experience in prediction ability to play high school basketball to determine which tests are most practical and useful to coaches in small high schools for measuring theses characteristics and to develop a method for predicting a successful high school basketball player.

Means, standard deviations, product moment correlation coefficient and standard scores were calculated. Multiple regressions were computed with the coaches ratings used as the criterion. Based on the four significant beta coefficients, multiple correlations were computed. The following conclusions were made:

1. Height, weight, experience, speed, power, ball handling ability, passing ability, shooting ability, and reaction influences on player’s success in basketball.
2. Experience, ball handling, passing and shooting ability have the greatest influence on a player’s success in basketball.
3. Prediction of successful basketball players from the basketball ability scores was 78% accurate. The accuracy of the prediction of starters was 68% of second team members 40% and of the all star team 38%.
4. A coach can determine 76% of his best players by using the following raw score formula:

\[ X: (0.54 \text{ Number of years of experience}) + (0.23 \text{ Speed dribble test score}) + (0.26 \text{ Wall test score}) + (0.15 \text{ Shooting test score}) - 10.11. \]

Dubey and Singh\(^9\) (2005) conducted a study on effect of diurnal variation on the ability of basketball players. Twenty students of B.P.Ed. and M.P.Ed. classes from Lucknow Christian College, Lucknow who studied basketball as their specialization game were randomly selected as subjects for this study. Their age ranged from 20 to 25 years. Single group design was chosen for the study. The training programme and competitions were conducted either in the morning session or in the evening session. To test the hypothesis Johnson’s playing ability test was used as criterion measure. The test was composed of (1) Field goal speed test (ii) Throw for accuracy (iii) speed dribble test. The data was collected under similar conditions at 6.00 hours and 10.00 hours, 14.00 hours and 18.00 hours. For finding the score of basketball playing ability test were added up. Analysis of variance (‘F’ ratio) was used as a statistical measure to find the significant difference. From the analysis the ‘F’ ratio was found significant and Scheffe’s post hoc test was applied. The result of the study indicated that playing ability in basketball was better in the evening session than in the morning sessions in comparison are at their optimum in the evening session.
ALLIED LITERATURE

Varma and Kumar\textsuperscript{10} (2006) conducted a comparative study of coordinative abilities of Kabaddi players of junior and sub-junior level. For this study 80 subjects (40 Sub juniors and 40 Juniors) were randomly selected from the different schools of Haryana State who participated at National or Junior National in Kabaddi Competition. The tools to assess the coordinative ability were reaction ability, orientation ability, differentiation ability, balance ability, and rhythmic ability. The analysis of variance was used to analyze the result. The results of the study revealed that significant differences were found between the Kabaddi players of two different levels in relation to reaction ability, orientation ability, balance ability and rhythmic ability. No significant differences were found among the Kabaddi players of two different levels in the relation to difference ability at 0.05 level. In all the four coordinative abilities that is reaction ability, orientation ability, balance ability and rhythmic ability. The sequences of performance in all the four coordinative abilities were juniors greater than sub-juniors.

Pratap\textsuperscript{11} (2005) conducted a study on selected coordinative abilities on 80 male Inter-University level judokas, 10 from each weight category with the purpose to compare the coordinative abilities of judokas among different weight categories. The selected coordinative abilities were reaction ability, orientation ability, differentiation ability, balance ability and rhythm ability. To compare coordinative abilities of judokas among different weight categories, analysis of variance (ANOVA) was employed at 0.05 level of significance. On the basis of results, the
following conclusions were drawn: No significance difference was found in different weight categories in relation to orientation ability (1.874). The significant difference was found in different weight categories in relation to differentiation ability (6.659), reaction ability (7.279), balance ability (8.445) and rhythm ability (2.160).

Kumar\textsuperscript{12} (2004) conducted a study with a purpose to characterize elite Indian Kabaddi players to their standard, human performance measures by their selected coordinative abilities. Another purpose of the study was to compare sub-junior, junior and senior players of Kabaddi by their selected coordinative abilities, the subjects for his study were selected from different universities and states of India who participated in the inter-university competitions, Sub-Junior and Junior National Championships in Kabaddi. A total of 120 subjects were selected, 40 from each level that is sub-juniors, juniors and seniors. For sub-juniors, the age of the subjects was 14 years and below (last day of the year) and up to an index of 220. For juniors, the age of the subjects was 18 years and below (last day of the year) and up to an index of 250. For seniors the age of the subjects was above 18 years. Index formula used in the study was: Index Point = Age in years + Height in centimeters + weight in Kilograms. The subjects were rested on selected coordinative abilities that is reaction ability, orientation ability, differentiation ability, balance ability and rhythm ability. To characterize elite Indian Kabaddi players to their standard, human performance measured by selected coordinative abilities, mean and standard deviation were used. To compare the selected coordinative abilities among sportsmen belonging to three levels (Sub-Juniors, Juniors and Seniors). One way of analysis of variance (ANOVA)
and post hoc (Least significant difference) test was used and the levels of significance were set at 0.05 level. The analysis of variance showed that there was a significant difference between sub-juniors, juniors and seniors in relation to reaction ability, orientation ability, balance ability and rhythmic ability as ‘F’ values were found to be significant (99.65, 9.60, 9.39 and 176.44) where these were required to be 3.92 at 0.05 level of confidence interval. In relation to differentiations ability there was not any significant difference between sub-juniors, juniors and seniors as ‘F’ value was not found to be significant (0.021), where this was required to be 3.92 at 0.05 level of confidence. After applying the post-hoc (least significant difference) test it was observed that in relations to reaction ability mean differences of sub-juniors and juniors; sub-juniors and seniors; juniors and seniors were found to be significant at 0.05 level of significance. In relation to orientation ability mean differences of sub-juniors and juniors; sub-juniors and seniors; seniors were found to be significant at 0.05 level of significance. In relation to balance ability mean differences of sub-juniors and juniors; sub-juniors and seniors; juniors and seniors were found to be significant at 0.05 level of significance. In relation to rhythmic ability mean differences of sub-juniors and juniors; sub juniors and seniors was found to be significant at 0.05 level of significance. Mean difference of juniors and seniors was found to be insignificant. It was concluded that in relation to reaction ability significant difference was found between three age groups that is sub-juniors, juniors and seniors. In case of reaction ability the sequence of performance between three groups was seniors, juniors, sub-juniors. In relation to orientation ability, significant differences were found between three age groups that is sub-juniors, juniors and seniors, in case of
orientation ability, the sequence of performance between three groups was seniors, juniors, sub-juniors. In relation to differentiation ability, insignificant differences were found between three age groups that is sub-juniors, juniors and seniors. In case of balance ability significant difference was found between three age groups that is sub-juniors, juniors and seniors. In case of balance ability the sequence of performance between three groups were seniors, juniors, and sub-juniors. In relation to rhythmic ability, significant difference was found between three age groups that is sub-juniors, juniors and seniors. In case of rhythmic ability the sequence of performing between three groups was seniors, juniors, and sub-juniors.

Ghosh\(^{13}\) (2002) conducted a study on selected coordinative abilities on 15 male sprinters and 15 male jumpers of Lakshmibai National Institute of Physical Education, Gwalior with the purpose to find out the coordinative ability between the track events and fields events. The variables selected for the study were orientation ability, differentiation ability, reaction ability, balance ability and rhythm ability. ‘t’ ratio on all the variables was applied and on the basis of the results the following conclusions were drawn:

1. In case of orientation ability and reaction ability there was a significant difference between the sprinters and jumpers.
2. On the other hand in differentiation ability, balance ability and rhythm ability there was no significant differences between the sprinters and jumpers.
3. It was observed that the sprinters and the jumpers did not differ completely.

Mol\textsuperscript{14} (2001) conducted a study on coordinative abilities on twenty male Hockey players of Lakshmibai National Institute of Physical Education, Gwalior with the purpose to find out the relationship of selected coordinative abilities to shooting performance in Hockey. The variables selected for the study were orientation ability, differentiation ability, reaction ability, balance ability and shooting ability. Pearson’s Product Moment Correlation was applied to find out the relationship of coordinative abilities performance. On the basis of the results the following conclusions were drawn:

1. No significant relationship of coordinative abilities to shooting performance in Hockey was found.
2. This study showed that shooting did not only depend upon coordination but many other factors may also affect it.

Hota\textsuperscript{15} (2001) conducted a study on selected coordinative abilities on twenty male football players studying at Lakshmibai National Institute of Physical Education, Gwalior with the purpose to find out the relationship of coordinative were orientation ability, differentiation ability, balance ability, rhythm ability and playing ability. To find out the relationship of coordinative ability to soccer playing ability, the collected data were subjected to Pearson’s product moment correlation. On the basis of the results, following conclusions were drawn:
1. Coordinative abilities namely orientation ability, reaction ability and rhythm ability were significant related to playing ability.
2. Differentiate ability and balance ability were not significantly related to playing ability performance.
3. Coordinative ability played very crucial role in football performance.

Sisodia\textsuperscript{16} (2000) conducted a study on selected coordinative abilities in sixty Judokas studying at various courses at Lakshmibai National Institute of Physical Education and Jiwaji University, Gwalior with the purpose to find out the effects of transcendental meditation on selected physiological variables and coordinative abilities in Judo. The variables selected for the study were reaction ability orientation, different balance and rhythm ability. The selected physiological variables were an aerobic power, vital capacity, resting respiratory rate, resting heart rate and body composition. ‘t’ test was applied for all variables. On the basis of the results of the following conclusion were drawn:

1. In case of an aerobic performance, transcendental meditation did not improve performance significantly in comparison to the non meditation group.
2. In case of vital capacity transcendental mediation had not shown any significant improvement among experimental groups as compared to the control group.
3. In case of total body fat percentage, transcendental meditation had shown insignificant change in comparison to non mediation group.
4. The balance ability improved significantly as compared to control group.

5. With regard to lean body weight, transcendental mediation was found to be ineffective for experimental group as compared to control group.

Rawal\textsuperscript{17} (1999) conducted a study on coordinative abilities on fifteen male basketball players and fifteen male handball players of Lakshmibai National Institute of Physical Education, Gwalior with the purpose to compare the coordinative abilities of basketball and handball players. The variables selected for study were orientation ability, differentiation ability, reaction ability, balance ability and rhythm ability. The comparison of various selected coordinative ability was done by using ‘t’ test. On the basis of the results following conclusions were drawn:

1. Basketball and handball players differ significantly in balance ability and reaction ability.

2. Basketball and handball players do not differ significantly in orientation ability, differentiation ability and rhythm ability.

Gautam\textsuperscript{18} (1996) conducted a study on selected coordinative abilities on twenty five female basketball players of Lakshmibai National Institute of Physical Education, Gwalior with the purpose to determine the relationship of coordinative abilities to shooting performance in basketball. The variables selected for the study were orientation ability, differentiation ability, reaction ability, balance
ability and rhythm ability. The relationship of coordinative abilities to shooting performance in basketball was established by using product moment correlation. On the basis of the results it was concluded that there is no significant relationship of coordinative abilities to shooting performance in basketball was found.

Senan\textsuperscript{19} (1994) examined a study on selected coordinative abilities on ninety undergraduates male students from Lakshmibai National Institute of Physical Education, Gwalior with the purpose to compare the coordinative abilities of Bachelor of Physical education students of Lakshmibai National Institute of Physical Education, Gwalior. The variables selected for the study were orientation ability, differentiation ability, reaction ability and balance ability. ‘F’ ratio was applied, which was followed by LSD Post-hoc comparison test to determine the significance between paired means. The level of significance was set at 0.05 level. On the basis of the results the following conclusions were drawn:

(1) Orientation abilities of first year and third B.P.E. students were better than second year B.P.E. students were better than other two groups. All three groups had almost the same levels of balancing ability.

(2) In orientation ability first year students performed significantly better than the second year students and there was no significant difference between the groups.

Bakshi\textsuperscript{20} (1994) conducted a study on coordinative abilities with the purpose to compare two groups of sports persons (Swimmers and
Runners) in coordinative abilities. The variables selected for the study were orientation ability, differentiation ability. For analyzing the data ‘t’ test was employed. On the basis of the study no significant difference between the coordinative abilities of swimmers and runners was found.

Kumar\(^{21}\) (1993) conducted a study on coordinative abilities on two hundred and forty boys studying in central school No. 1, Gwalior with the purpose to find out the coordinative abilities between ten to sixteen years of age. The variables selected were orientation ability, differentiation ability, reaction ability, balance ability. For finding out the significance of different of means among various groups an analysis of variance (‘F’ ratio) was applied, and was followed by Scheffe’s test of post–hoc comparisons to significance between the paired means. On the basis of results the following conclusions were drawn:

1. Performance of boys, ranging in age between ten and sixteen years, in coordinative abilities increased as the age advanced.
2. The improvement in different coordinative abilities with the advancement of age was not uniform.
3. Improvement in balance ability was faster when compared with other tested coordinative abilities.
4. Differentiation ability of the boys increased with age but it was not significant between the adjacent age groups
5. Reaction ability of the boys improved steadily with the increase in age.
Tamrakar and Singh\textsuperscript{22} (2001) investigated this study to determine the effects of plyometric training, weight training and its combination on selected motor components for the development of speed, strength and explosive power. The criterion measure was fifty yards dash, leg and back dynamometer and sergeant jump respectively. The subjects for the study were twenty four inter-university players studying in B.P.Ed. and M.P.Ed. in physical education department of Guru Nanak Dev University, Amritsar, Punjab (India). They were from different games and sports such as football, volleyball, basketball, hockey, handball and athletics where the above mentioned motor components play a major role. The average age was twenty one years, ranging from twenty to twenty five years. Four groups were formed, three experimental and one control, consisting of six subjects each to collect data using random sampling technique. The experimental groups participated in training and combination training for eight weeks and the control group performed the routine work. The data was collected in the beginning and at the end of eight weeks experimental period in terms of pre and post test. The training schedule was prepared systematically and carefully by keeping the individual differences of the subjects and loading principles in mind, the ANCOVA and ‘t’ test was applied to find out the differences in pre and post test scores of all groups. The significance was tested at 0.05 level. It was found that:

1. Plyometric training improved speed where on weight training and combination training showed no effect.
2. Combination training increased leg strength but weight training and plyometric training have not contributed towards its development.

3. None of the training protocol has been proved to enhance explosive power.

Majumdar and Rathore\textsuperscript{23} (2001) carried a research study on kinesthetic perception of male and female basketball players. In this study twenty males and twenty females were randomly selected as subjects from Lakshmibai National Institute of Physical Education, Gwalior. Their age ranged from 18 to 24 years. All of them were participated in the regular activity classes in accordance with the requirement of the institute curriculum. All subjects had basketball as their specialization game or advanced course. In order to measure the kinesthetic perception or the ability of the subjects to predict the position during movements the kinesthetic obstacle test was administered. An area of 40 x 5 feet was marked on the floor and twelve chairs were arranged as obstacle in accordance with floor pattern as per the requirement. Each subject was allowed one practice trial of walking through the course without being blind folded. Then the subject walked through the blind folded for the test. It is observed from the findings that there is no significant difference between the kinesthetic perceptions of both sexes.

Muckus, Zdanavicienal and Cizauskas\textsuperscript{24} (2000) designed a study on evaluation of testing quality of psychomotor reaction (PMR) of basketball players. The aim of the study was to assess quality (information and reliability) of PMR test, which is used for evaluation of athlete’s speed
characteristics and motion indices responsible for formation of separate PMR components. Nine basketball players from LKKA – At least team were included in this study; two tests were performed (1) maximal up jump from standing position and (2) PMR (rapid jump). The first test is designed for evaluation of athlete’s strength and other related physical conditions, the second test – for evaluation of PMR components. Squatting, take-off and flight duration, depth of squatting and speed at the moment of breaking from touch with the platform, height of jump and work performed values are statistically significantly greater in case of maximal jump than in rapid jump. On the other hand, mean force and dynamic force are greater in case of rapid jump. Power values in both cases are similar. Speed of PMR is influenced by parameters of jump. Correlation between criterion and jump parameter can be used for assessment of information of the test. Overall timing of PMR has a strong positive correlation with squatting phase (r = 0.80) and relative power (r = 0.75). Latent time has a good correlation with duration of squatting (r = 0.60) and power (r = 0.62). Jump parameters have the greatest influence on motion on motion time: A strong correlation with duration of squatting (r = 0.90), take–off duration (r = 0.76) and has a negative correlation with dynamic force (r = 0.55) quality of which can describe testing aspect, are used. It is demonstrated, that test batch two sublet is sufficient, reliability of coefficient of the index is 0.19. The conclusions of the study were:
(a) Kinematics and dynamic indices of jump from standing position of basketball players depend on motivation: maximal duration of jump, mean force and work performed are greater and dynamic force is better in rapid jump (b) indices of PMR depend on jump duration and dynamic
force (c) test batches, combined from derived PMR components, kinematic components are more informative than dynamic components (d) selected test batches with two sub–components are informative enough.

Khan and Singh\textsuperscript{25} (1995) administered a study which was aimed at unrevealing the association between gender and format of games and psychomotor abilities. 409 subjects were tested individually on the parameters of reaction time (visual and auditory), visual concentration depth, perception steadiness and two arm coordination (Time and Error Factors) by using reaction timer, Knox cube imitation test, Howard Dolman’s depth perception box, Gardner steadiness, tester and two arm coordination test respectively. The data was analyzed by using two way analysis of variance. The results revealed that the gender of subjects influenced by two arm coordination. The individual game athletes differed significantly from team game players on steadiness. In visual reaction time, male athletes of individual games and female players of team games showed significant difference when compared to their counterparts. The rest of the psychomotor parameter remained resistant to the influence of gender and format of the game.

Slater and Hammel\textsuperscript{26} (1995) undertook a study to compare the reaction time measures to visual stimulates and arm movement. The purpose of the study was to compare the reaction time measure for arm displacement and visual stimulation. Reaction time measures from selected group of physical education, and liberal art measures were compared. Analysis of the data revealed that only a modest relationship
exited between the two reaction time measures. Significant difference in reaction time existed among several group for both reaction measures.

Rai et. al.,\textsuperscript{27} (1995) investigated the study on kinematics analysis of sprint running in the pre-adolescent boys. The study was undertaken in school group children between 8 to 11 years of age to study the development of these factors and their interrelationship in the pre-adolescent age. The boys were asked to run 30 mts. distance and this was filmed using a high speed camera operating at a speed of 100 frames/second. The film frame was analyzed by using analyzing projector. The contact time, flight time and stride frequency was calculated for each stride. The stride length was measured for each stride from the foot imprints on the track. The results of the study showed that velocity increased up to 25 mts. in all age groups. The contact time was highest in the eight years old boys which showed higher timing in the 30 mts. distance. Out of contact time and flight time, only the contact time showed relationship with the time of 30 mts. distance. The results of the study and the reports of other workers, it is suggested that this may be used as one of the criteria for selection of sprinters.

Sohi and Ikpene\textsuperscript{28} (1994) studied the effects of gender and audience conditions on psychomotor performance. For this three audience on conditions were employed, no-audience, non-evaluate audience and evaluate audience. Voluntary male and female subjects (n=120) age between 13 and 14 years who were inexperienced as per the tasks were used. The experimental design represented 2 x 3 factorial designs with two levels of gender (male and female) and three level of
audience conditions. Both 20-20 male, female were divided in three level of audience condition. The entire performance was recorded by experiments and the subjects were not aware that his / her performance was recorded. The following conclusions were drawn:

a) That the three audience conditions had no significant differential effects on the performance outcomes of either the subject.

b) The subject performance between the male and female subject on accuracy and telic balance tanks are attributed to subject gender.

Reddy (1993) investigated a study on motor behavior and selected coordinative abilities on city school for Deaf, Ferozshah Kotla, New Delhi, the programme on motor behavior and selected coordinative abilities of deaf and dumb students. The variables selected for the study were:

1. Kinesthetic perception (a) Distance perception test (b) Bass Kinesthetic (c) Kinesthetic test.

Accuracy (A) overhead throw for accuracy, in order to assess selected coordinative abilities, three variables were selected: (a) balance (b) rhythm (3) reaction. The ‘t’ test was applied on all variables for the subjects. On the basis of the basis of the results following conclusions were drawn:
(1) The significant effect of physical education programme on kinesthetic perception, the regular programme helped the subjects to perceive their body movement, developed precision, alertness of mind and body.

(2) Accuracy improved due to regular involvement in physical activity.

(3) The score of rhythm improved after eight weeks of participation in physical education program. The rhythm scores improved due their participation in physical and Kinesthesia.

(4) Reaction scores improved due to their participation in physical education.

(5) On the whole results showed that the students improved significantly in coordinative abilities after their active involvement in physical activity which comprised of gymnastics, athletics and yoga.

Mukerjee (1989) had taken the project to investigate the patters of diurnal variation of selected psychomotor and motor ability components in male and female (fifty male and fifty female) students undergoing Bachelor of Physical Education course at LNCPE, Gwalior, were randomly selected as subjected for this study. The subjects were tested at four selected timings during the day (6.00 am, 10.00 am, 2.00 pm, 6.00 pm) on the selected Psychomotor and motor ability components. The data on components on reaction time, speed movements, depth perception, speed of right and left grip strength, agility, flexibility, dynamic balance and two hand coordination were respectively collected using Anand
Electronic Reaction time apparatus. Nelson’s speed of Movements test 50 mts dash, Grip Dyanamometer, 4 ×10 shuttle run, Modified sit and Reach Test. Analysis of data revealed that subjects (both male and females) exhibited significant diurnal variations in the selected physical motor and motor ability components at different selected times of day as obtained ‘F’-ratio for reaction time (3.20 for males and 4.90 for females) kinesthetic perception (10.00 for males and 14.83 for females) speed of movement depth perception (10.45 for males and 6.27 for females) speed (7.86 for males and 6.27 for females) right grip strength (5.27 for females and 5.93 for females). The study showed that the significantly better performance of both male and female occurred at 10.00 am followed by 6.00 pm except in depth perception in males and kinesthetic perception and left grip strength in females, where best performances occurred at 6.00 pm followed by 10.00 am.

Sreejit (1988) studied the psychomotor performance variation among players of basketball, volleyball and badminton. The subjects were tested on reaction time, speed of arm movement, multilimb coordination, arm – hand steadiness and finger dexterity. The significant differences in performance among the players of different sports on the selected psycho – motor variables were analyzed by one way analysis of variance. The following conclusions were drawn:

1) Basketball and volleyball players had a marked difference in their hand reaction time.
2) Basketball and volleyball players exhibit difference in the speed of arm movement but to a lesser degree as compared to their hand reaction time.

3) Basketball, volleyball and badminton players did not exhibit any marked difference in their multilimb coordination, arm hand steadiness and finger dexterity.

Vaid\textsuperscript{32} (1987) conducted the study on comparatively analysed effects of mental fatigue on selected psychomotor components of sportsmen and sports women and concluded that artificially induced mental fatigue significantly affected kinesthetic perception of sportswomen where as in the case of sportsmen balance was negatively affected but two hand coordination improved significantly under the influence of mental fatigue. Sportsmen and sportswomen did not differ significantly on chosen psychomotor components if mental fatigue was not induced. But when induced to sportswomen they were found to be better in balance than sportsmen.

Gill\textsuperscript{33} (1987) investigated on one hundred students from Lakshmibai National Institute of Physical Education, Gwalior constituted sportsmen group and participated in the All India Inter University Competition year 1985 – 86 and 1986 – 87 in selected sports 20 subjects for each game such as Basketball, Cricket, Football, Hockey and Volleyball. Non sportsmen group was comprised of one hundred subjects selected from various Arts colleges of greater Gwalior.
The test on selected psychomotor (depth perception kinesthetic perception and time sense) and motor components (running speed, agility and two hands coordination) were administrated in the human performance laboratory.

The flexibility, dynamic flexibility, leg explosive strength, abdominal strength and gross body coordination were significant at 0.05 level.

Kay34 (1980) studied sixty subjects for reaction time, movement time and trilateral reaction time responses to a visual stimulus. Three way analysis of variance revealed that males were faster than female on reaction time, movement and trilateral reaction times. There was a difference among limb reaction altered by training. Moreover, time may be significantly altered by athletic training.

Betty35 (1980) studied on South State University basketball team (N=212) and were measured on State Anxiety Inventory (SAI) Sports Competition Anxiety Test (SCAT), Program, H.R., Game Field goal, Free throw subjects in groups consisted of the players who attempted over 12 field goal or less. Results of ANOVA indicated the significance (0.05) difference between groups on season field goal and SAI. Subsequent data analysis through out this study incorporate. Only the values from group – I a significant (p > 0.05) multiple regression equation to estimate field goal shooting from selected measures of anxiety produced multiple regression ranging from 47 to 66 and accounted for between 22 to 44 percent of variance in performance. A
multiple regression equation for predicting free throw success was not significant (P < 0.05).

Christine, Michael and Iris \(^{36}\), (1994) had done a research study in the “Effects of two semirigid prophylactic ankle stabilizers on speed, agility, and vertical Jump.” The purpose of this study was to compare the effects of two semi rigid prophylactic ankle stabilizers on vertical jump, 80 feet Sprint, shuttle run, and four-point run performance. Eight male and seven female high school basketball players, who denied prior ankle injury and prophylactic ankle stabilizer experience, completed the four performance events under the conditions of active ankle training brace, air cast sport stirrup, and non braced control. Data analyses consisted of four 1 x 3 ANOVAs with repeated measures on the independent variable of brace condition. Results of the analysis revealed no significant differences among the experimental conditions for any of the performance events tested. In conclusion, the Active Ankle Training Brace and Air cast Sport Stirrup did not facilitate or adversely affect performance involving speed, agility, and vertical jump of high school basketball players.

Kioumourtzoglou et. al\(^{37}\), (1998) “Cognitive, Perceptual, and Motor Abilities in Skilled Basketball Performance.” The differences among athletes of differing skill should assist successful identification and selection of the best athletes in a specific sport. For the purpose of this study, a laboratory study was conducted with a group of 13 men on the elite male national team of basketball players, 22 to 23 years of age, and a control group of 15 men of equal age (physical education class) to
assess differences in their scores on cognitive skills (memory-retention, memory-grouping analytical ability), perceptual skills (speed of perception, prediction, selective attention, response selection), and motor skills (dynamic balance, whole body coordination, wrist-finger dexterity, rhythmic ability). Analysis showed that elite male basketball players scored higher on hand coordination and lower on dynamic balance given their anthropometric measurements. Elite players were better on memory-retention, selective attention, and on prediction measures than the control group. The above skills are important in basketball performance. Researchers may examine whether other factors contribute more in the development of perceptual and cognitive skills.

Kazimierz et. al.\textsuperscript{38}, (2003) conducted a study on the “Effects of Specific Conditioning on Speed Abilities in Young Female Basketball Players.” The authors analyzed the influence of training executed during preparation before Women’s U-17 European Championships on speed abilities. The authors determined if it is possible to significantly change the level of speed abilities during six weeks of training and characterize relation between training volume and intensity and the level of maximal running velocity. Research was conducted on 12 elite young basketball female players, representatives of Polish U-17 national team (body height and mass respectively 178, 04 \(\pm\) 6,827 cms. and 67, 89 \(\pm\) 6,812 cms.). Testing procedure included 15 minutes general warm-up, that included running and stretching followed by four maximal sprints at 30 mts. They were separated by five minutes rest intervals and only last two were registered. The time at 5\textsuperscript{th} and 15\textsuperscript{th} mins. was significantly better after conducted training (\(F = 5,963\) and \(p > 0.023\); \(F = 4,307\) and \(p > 0.050\)
respectively). A very important result was obtained in case of maximal velocity, which improved also significantly by 5,368% (F=4682 and p=0.041). The relation between time at 5\textsuperscript{th}, 15\textsuperscript{th}, 20\textsuperscript{th}, mins. are statistically significant as well as between 15\textsuperscript{th}, 20\textsuperscript{th}, and 30\textsuperscript{th}. A significant correlation appeared also between the longest distances i.e. 20th and 30th mts. Author determined that after six-weeks of training significant improvement was registered at short running distance (5 and 15mins) and maximal velocity. The relationship between training volume at specific intensities and improvement of speed abilities is unclear and need further experiments.

Simenz, Dugan and Ebben\textsuperscript{39}, (2005) had examined “Strength and Conditioning Practices of National Basketball Association Strength and Conditioning Coaches”. This study describes the results of a survey of the practices of National Basketball Association strength and conditioning (NBA S & C) coaches. The response rate was 68.9% (20 of 29). This survey examines (a) background information, (b) physical testing, (c) flexibility development, (d) speed development, (e) plyometrics, (f) strength / power development, (g) unique aspects, and (h) comments from coaches providing additional information. Results indicate, in part, that coaches assess an average of 7.3 parameters of fitness, with body composition testing being the most common. All coaches used a variety of flexibility development strategies. Results reveal that 17 of 20 (85.0%) of NBA S & C coaches follow a periodization model. Nineteen of 20 coaches (95.0%) indicated that their athletes used olympic-style lifts. All coaches employed plyometric exercise with their athletes. The squad and its variations, and well as the
Olympic-style lifts and their variations, were the most frequently used exercises. The survey serves as a review and a source of applied information and new ideas.

Kioumourtzoglou et. al., (1998) administered a study on “Differences in Several Perceptual Abilities Between Experts and Novices in Basketball, Volleyball and Water-polo.” The aim of this study was to examine differences between experts and novices in a number of perceptual abilities. Three groups of elite athletes, 44 members of Greek national teams in basketball (n=12), volleyball (n=13), and water-polo (n=19) were selected. Two groups of physical education students (n=18 and 21) were novices. The measured abilities were selected as the most important for an elite athlete by expert coaches in the three sports. The four most frequently selected abilities for each sport, according to the coaches’ opinions, were finally assessed. Analysis showed that differences were fewer than expected. Basketball experts were better on prediction and selective attention. Volleyball experts performed better on perceptual speed, focused attention, prediction, and estimation of speed and direction of a moving object. Water-polo players have significantly better scores than the novices on decision-making, visual reaction time, and spatial orientation. It seems that the nature of each sport strongly influences the way perceptual abilities differentiate elite athletes from novices.

Albert (1969) collected data know the effect of physical fatigue upon the learning of motor skills, 75 college women were assigned in systematic ratio to either a control group or to one of the two
experimental groups. All subjects were given a total of 50 trails on the pursuit rotor, 25 trails on day one, the practice session and 25 trails on day two, the test session. One of the experimental groups was fatigued early in the practice session while the other was fatigued late in the practice. Fatigue interpolated performance improvements but had no effect upon the amount learned.

Haley\textsuperscript{42} (1972) investigated the effect of age on physical performance of elementary school boys in grade one to six. Thirty boys were randomly selected from each grade between the age group five to twelve motor performance tests were administered to measure sprint speed, power agility, reaction time, static balance and strength. The results of analysis of variance revealed a significant difference between the grade level on all twelve variables, Scheffe’s test indicated that performance increased through elementary grades. The motor performance increased through elementary grades. The motor performance scores on all variables tend to increase as age increase. The lowest increase was between grades one and two and between five and six with middle grade providing plate effect.

Prakash and Dureha\textsuperscript{43} (1998) assessed the physical, physiological and psychological variables as predicting factors in Kho-Kho performance. The subjects were 150 male university level players of India. Their age ranged from 17 to 25 years. The judgment of Kho-Kho playing ability of each subject was based on the four point scale, which was evaluated by the three experts according to the players’ achievement levels of performance. The Kho–Kho performance
predicting factors were assessed by the selected physical variables (speed, explosive strength, agility, speed endurance, speed of movement, height and weight), physiological (heart rate, vital capacity and cardiovascular endurance) and accuracy variables. The mean, standard deviation, correlation, partial correlation and multiple correlation was employed for the analysis of data at 0.05 level of significance. Within the limitations of the study, the following conclusions were drawn: The selected physical variables (speed, explosive strength, agility, speed endurance and speed of movement), physiological variables (vital capacity, and cardiovascular endurance) and psychological variables (visual perceptual accuracy can be used as predicting factors to assess the Kho–Kho performance.

Steinhaus\textsuperscript{44} (1996) in his study, “your muscles see more than your eyes”, stated that physical educators have long recognized that importance of kinesthesis. He is of opinion that individual can observe a demonstration and perceive the significance of the sequence of movements and are able to develop a physical empathy which enables them to learn a movement much faster than others whose kinesthetic ability is not has highly developed. In conclusion he says that our muscles see more than our eyes. Hence physical educators and coaches should constantly urge performers to be aware of the feel of the correct movement and the movement of effort or force involved, and the position of the body part, racket, club, etc., at various of in the movement.
Herrowitz\textsuperscript{45} (1990) investigated the perceptual-motor abilities of pre-school children and described a number of perceptual-motor training activities for pre-school children which emphasized the various sensory modalities and gave suggestions for evaluation of performance. She strongly cautions that there is no evidence that training on the different equipment will transfer to performance on other motor tasks.

Bandura\textsuperscript{46} (1986) examined the effect of a goal setting program on basketball skills AAHPERD (1984) and self efficiency of adolescents. Self efficiency and basketball skills were pre tested on a group of seventy eight (N=78) basketball players (M=15-1 years) the sample was divided into three equal numbered groups (n\textsubscript{1}=n\textsubscript{2}=n\textsubscript{3}=26) Univariata AVOVA’s revealed no significance skills and self efficiency differences in pre testing among the three groups. During the experimental treatment period the groups were exposed to three different types of goal setting and practiced the skills in nine separate basketball session, three sessions per week. The three types included are a) do your best approach of goal setting(experimental group) b) self set approach of goal setting (experimental group) and c) control group with no goals. The participants were post tested, after three week treatment period on basketball skills and self efficiency. According to our findings different types of goal setting improve performance to a wider extent than absence of goals in adolescence. Further participants exposed to the self set goals scored significantly higher than the participants exposed skills and self efficiency. Adolescent player who set their goals individually improved more than players who were in
instructed to do self set goals appear as a regulatory factor at the process of improved performance of adolescent basketball players.

The three types include (a) do your best approach of goal setting (b) self set approach of goal setting (c) control groups with no goals.

A scholar\textsuperscript{47} (1996) from north east Louisana University established a Kinesthetic obstacle test. The test was to measure the ability to predict position during movement without the use of the eyes. The test was applicable for ages ten through colleges. However the reliability of the test was found to be quite low ie, \( r \) of 0.30 for women an \( r \) of 0.53 for men. It was concluded that further experimentation with scoring system was required for the test.

Atkins and Rainey\textsuperscript{48} (1987) opines that the basketball is probably the leading ball game in the world as far as action occurrence is concerned. In modern sports, basketball had advanced scientifically to a high degree that a coach has to vary his angle of approach from time to time to produce the best performance from the players of varying calibers within the prescribed period and with available facilities. It is fast, aggressive and attractive.

Alricsson, Harms-Ringdahl and Werner\textsuperscript{49}, (2001) investigated the reliability of two sports related functional test, a speed test (slalom-test) and an agility test (Hurdle-test) eleven athletes age eleven years(eight boys, three girls) participated voluntarily in the
study. All subjects completed four different test sessions for both the slalom-test and the hurdle-test using six standard track hurdles placed at two meters intervals along a twelve meters length of track. There were no significant differences between testing sessions for either the slalom-test. \((p<0.99)\) or the hurdle-test \((p<0.96)\), showing no systematic variations between test times. The intraclass correlation coefficients were 0.96 and 0.90 respectively, indicating a good reliability. We conclude that the slalom-test and the hurdle-test or reliable sports related functional tests for measuring speed and agility in groups of young athletic individuals.

Singh\textsuperscript{50}, (1984) states that a pure power movement of the leg muscle would restrict the take off for a jump to set position such as crouch, eliminate the use of arm to the asses the jump. Thus the best widely used jumps involves the leg muscles in vertical jump and standing broad jump.
REFERENCES


