CHAPTER II

REVIEW OF LITERATURE

The researcher has searched various electronic databases and libraries to find out related studies. However, there are very few studies conducted on this topic. Nevertheless, as the purpose of this study is to see the efficacy of breathing exercises and pranayama interventions in the performance of discus throwers, no research reports in this direction is available so far. However, few researches on throwing performance considering other interventions are presented below.

The relationships among academic achievement, strength, motor skills, and self control in 3rd grade children were determined (Crow, 1990). Each of 217 randomly selected subjects was administered the comprehensive test of basic skills, strength test battery, motoric skills battery, walk a line test, and draw a line test. Results indicated a significant relationship (p<0.05) between mathematics and strength. However, only 3.842% of the variance of the variable mathematics was predictable from the variance of the variable strength. Significant differences were noted between the sexes in reading and total achievement. A highly significant difference was noted in language. There were significant differences among the schools in the variables motor skills and walk a line. Highly significant differences were observed in the variables reading, language, total achievement, strength, and draw a line. The only significant predictor was motor skills for the criterion mathematics. The univariate F score was 7.416, which was highly significant, but accounted for only 3.61% of the variance.

The relationships between the grab start and the traditional swimming start to selected leg power tests (standing long jump and vertical jump) were studied in 12 female competitive swimmers from Arizona State university (Pipher, 1987). A two way ANOVA revealed the X performance time of the grab start was faster than the traditional start for all subjects tested (p<0.005). the start was defined as an 8 feet distance from the starting block. A significant r was found between body height and the grab start. Body weight was found not to be significantly related to either start.
Although no significant relation was found between the standing long jump or vertical jump to either start, the results suggest that leg power may be a prerequisite for successful starts using the grab technique, however, it appears not to be a factor in the traditional start.

Zaras et al., (2016), assessed the force development rate, architecture of muscle, and performance of novice competitive field and track throwers. Rate of force development i.e. RFD is a very important component for performing in explosive functions, however, it might be possible that muscle architecture characteristics may be linked to power performance and RFD. The aim of this study was to find out the relation between muscle architecture, RFD, and performance in novice field and track throwers. 12 novice field and track athletes completed ten weeks of training. Pre and post i.e. T1 and T2 training performance was assessed in competitive field and track throws, common shot put tests, 1 RM strength, RFD isometric leg press, vastus lateralis architecture and body composition. Competitive field and track throwing performance and shot put throwing performance from power position was increased by 6.76 ± 4.31% i.e. (p < 0.001) & 3.58 ± 4.97% i.e. (p = 0.019) respectively. 1 RM strength and rate of force development was also found to be increased i.e. (p ≤ 0.05). Fascicle length and Vastus lateralis thickness was found to be increased by 13.41 ± 16.15% (p = 0.016) & 5.95 ± 7.13% (p = 0.012) respectively. Performances in shot put tests and RFD along with fascicle length were found to be significantly correlated at T1 & T2 (p ≤ 0.05). RFD, fascicle length, and muscle thickness showed close correlations (p ≤ 0.05). Also, significant correlations were observed among the percentage change in lean body mass & percentage increase in RFD. The percentage increase in RFD and muscle thickness, when calculated together, could predict percent increase in the shot put throw test from power position i.e. (p = 0.019). The obtained results suggested that leg press RFD is a good predictor of performance in shot put throw tests which are commonly used by field and track throwers.

Terzis et al. (2009) investigated the acute effect of drop jumping on performance of throwing. 8 men and 8 women who had been trained with basic shot put throwing skills moderately, performed three squat underhand throws front shot after short warm up. After 3 minutes they were asked to perform five maximal drop jumps from
40 centimeters consecutively. Squat underhand front shots were repeated immediately after drop jumps. The other day, Six RM muscular strength in leg press was also assessed. Fiber cross sectional area and fiber type composition were determined by taking muscle biopsy from Vastus lateralis. It was observed that performance of throw was increased significantly after drop jump (8.25 +/- 1.1m versus 8.63 +/- 1.3m i.e. p < 0.01). Type II muscle fiber area percentage was found to be related significantly to increase in performance of throw after drop jump (r = 0.76 i.e. p < 0.01). It was found that increase in performance of throw was non-significant in women (7.56 +/- 1m versus 7.67 +/- 0.9m) and significant in men (8.94 +/- 1m versus 9.60 +/- 0.9m i.e. p < 0.01). Off note, type II fiber area percentage was found to be higher in men as compared to women (Men: 66.4 +/- 13%, Women: 50.2 +/- 15% i.e. p < 0.01). 6 RM i.e. leg press strength was related moderately to increase in performance of throw after drop jump (r = 0.50 i.e. p < 0.05). The results obtained suggested that drop jumps prior to a throw causes improvement in athlete’s performance that have high type II muscle fiber area percentage and slight improvement in athlete’s performance who have enhanced muscular strength.

Fifty five respondents, comprising males (n1=39) and females (n2=16), belonging to different socio-economic groups and having been divided into three age groups, were tested for their auditory and visual reaction time both simple and conjunctive - before and after one month Comprehensive Training in Astanga Yoga (CTAY) imparted daily for 2 hours. Entire group of 55 respondents showed highly statistically significant reduction in all the four types of reaction time, regardless of their age, sex and socio-economic status. However, the smaller age group, in general, showed a slightly better effect of Yoga on all the four types of reaction time (Vinod et al., 1998).

The relationship of four structural maturational variables to four measures of throwing performance was examined by Eoff (1985) in light of sex difference and developmental differences. Structural maturational variables were height, weight, arm length, and subcutaneous fat. The four throwing measures used to identify throwing ability were velocity, distance, accuracy, and quality of throwing form. Velocity was measured with a radar gun. Distance throws were completed using AAHPERD test standards. Accuracy consisted of 10 throws each at 2 distances.
Two raters assessed throwing form from video tapes of velocity throws. A test devised by Mosher and Schutz (1983) was used to rate each subject's developmental level. Subjects were 146 1st and 4th graders participating in an ELE PE program. MANOVA results indicated that there were significant grade gender differences on throwing performance variables and SM variables. Significant canonical correlation results indicated that there was a relationship between arm length and the throwing composite for 1st grade girls. A significant relationship was found between the 2 SM variables of arm length and weight and the throwing composite for 4th grade boys. Multivariate multiple regression analysis results indicated that the set of SM variables was a significant predictor of distance throwing for 1st and 4th grade boys. There were no significant relationships between the throwing composite and SM set. These results indicate that individual SM variables contributed to a mechanical advantage in throwing, but that as a composite, SM variables are not related to difference in throwing performance between boys and girls.

The effect of asymmetric experience on bimanual performance was examined by Larkin (1985) using a forearm supination and pronation task. 30 right handed women (20-45 yrs) were randomly assigned to one of 3 experimental conditions: left hand training, right hand training, or bimanual training. Movement asymmetries were demonstrated by a lack of equivalence in the kinematic profiles of the hands during bimanual performance. ANOVA of the bimanual performance indicated that the left trained group demonstrated training effects for measures of peak velocity, and response latency for the left hand. The right trained group showed a response to training with a higher peak velocity with the right hand. The bimanual control group did not demonstrate any clear asymmetries. Relatively stable asymmetries independent of the direction of training were manifest by a shorter movement time and displacement for the right hand, and a shorter reversal time on the left hand. The hands moved toward a more equivalent performance with extra experience on the bimanual task. Thus, relatively stable asymmetries were considered to represent adjustable functional differences between the hands resulting from their independent histories, the left hand as stabilizer and the right as a dynamic mover.

Zaras et al. (2014) studied the effect of power training with heavy versus light weights during tapering phases of double period training year on field and track
throwing performance. 13 field and track throwers (16-26 years of age) underwent eight months of systematic training meant for performance enhancement which aimed at two tapering sessions during spring and winter competition periods. Shot put throwers performed tapering sessions with two different resistance training weights (counterbalanced design): seven athletes utilized 30% 1 RM (1 repetition maximum) light weight tapering (LT), whereas six athletes utilized 85% 1 RM (1 repetition maximum) heavy weight tapering (HT) during winter tapering session. The opposite was done at spring tapering session. The throwing performance, vertical jumping, 1 RM strength, rate of force development (RFD), rate of perceived exertion, and vastus lateralis architecture were evaluated at the beginning and end of each tapering session. Performance of throw was found to be increased significantly by 5.6 ± 0.9% and 4.8 ± 1.0% after HT and LT respectively. Squat jump power and leg press 1 RM were found to be increased more than HT than LT (-3.4 ± 2.5% versus 5.9 ± 3.2%, and 0.9 ± 1.4% versus 5.1 ± 2.4% respectively, p ≤ 0.05). Also, it was observed that leg press RFD increased more in HT (38.1 ± 16.5%) as compared to LT (-2.9 ± 6.7%), however LT led to lesser fatigue as compared to HT i.e. (4.0 ± 1.5 versus 6.7 ± 0.9 i.e. p ≤ 0.05). HT or LT program did not caused any change in muscle architecture. The findings of this study suggested that the throwing performance increases after tapering sessions with LT or HT similarly in field and track throwers. However, HT led to greater whole body power, increased strength, and RFD.

Stumpo (1985) investigated the relationship between power and percent body fat and/or power and anthropometric somatotypes in 16 to 18 year old male athletes. The subjects were sixty male student/athletes. The margaria Kalamen power test and the heath carter anthropometric somatotype method were administered to determine power output and body classifications, respectively. Wilmore Behnke regression equations were used to statistically analyze the subjects to determine percent body fat. A Pearson product moment correlation coefficient was calculated to determine causality at the 0.05 level of significant. The results of this investigation indicated that a significant relationship existed between power and percent body fat, power and endomorphy, power and mesomorphy, and power and ectomorphy.
George Abraham (2012) conducted a study with the aim to improve the physical performance for sports activities. The objective of this study was to investigate speed training without and with explosive strength on maximum speed and frequency. To achieve this, thirty six physical active students were selected as subjects and their age group ranged between 18 and 21 years. The subjects were randomly divided into three equal groups with twelve subjects each. Group I was involved with speed training without the support of explosive strength, group II was given speed training combined with explosive strength, group II acted as control. Both experimental groups underwent their respective experimental treatment for 12 weeks, three days per week and a session on each day. Control group was not exposed to any specific training. Maximum speed and stride frequency were taken as criterion variables for this study. The collected data were analyzed using analysis of covariance and post hoc test. There was no significant difference in pre test data of experimental and control groups. The post test mean values of speed were 7.47, 7.33, 7.67 and the values of stride frequency were SWOEG 4.08, SWEG 4.13, SWEG 4.13, CG 3.97. Thus results revealed that both SWOEG and SWEG produced significant difference on speed and stride frequency as compared to control group.

Effect of Aum, recited in i) Low pitch manner and ii) High pitch manner on EEG (Alpha%), Heart Rate (HR), Respiratory Rate (RR), Eye movements (EM), Chin muscle activity (EMG), and Blood pressure (BP) was studied with the help of 8 channel polygraph and an electronic BP apparatus on six students (4 Females and 2 Males) of G. S. College of yoga & Cultural Synthesis. Each subject recited Aum for 10 times at a stretch, separately for both the conditions. Readings were taken before, during and immediately after Aum recitation. During High Pitch Aum recitation (HPAUM), HR increased marginally by 6 beats/min., EM increased by 2/10 sec, EMG showed significant increase in chin muscle activity. During Low Pitch Aum recitation (LPAUM), HR did not change, EM decreased by 1/10 sec. The changes in EEG and BP were not significant. Although the relaxation after both HPAUM and LPAUM appeared similar as judged through HR, RR and BP, the subjects reported better relaxation and peacefulness after LPAUM. The study indicates that HPAUM brings about a milde sympathetic tone while LPAUM leads to parasympathetic predominance.
Determination of the heart rate deflection point which is important for predicting anaerobic threshold, studied by various mathematical models. Purpose this study conducted by Siahkohian (2007) was to use a new mathematical model referred to as parallel straight line slope to determine the heart rate deflection point. Fifteen active young men were selected as subjects. The Hoffman testing protocol (the initial work load was 40 watts, with work load increasing by 20 watts every minute took place on a calibrated electronically braked cycle ergometer. Heart rate was monitored continuously and stored in 2 intervals by a cardio frequency meter. The mathematical model of PSLS allows for the precise calculation of the HRDP. No significant differences emerged between PSLS and other mathematical models. Based on these results, it could be suggested that PSLS model is a good alternative to other mathematical models in determining the HRDP.

Research study (Mohammed Gaber 2012) was carried out to identify effect of co-ordination exercises on muscle strength in novice athletes selected in national youth project and level of records made with respect to few selected athletic events. Stability of vertical jump and 200 grams ball throw tests were administered to evaluate the muscular strength of novice athletes. 1000 meters run, 75 meter run and long jump record levels were identified. The researcher used pre post design for this research study as it was found to be most suitable design. One hundred novice athletes were selected through purposive sampling method. The study participants of this study were 1997 born and also represented lower and upper governorates. The study results showed statistical difference in selected study variables. The researcher observed that muscular strength of arms and legs improved by 53.50% and 43.97% respectively. The record levels for long jump, shot put, 75 meter run, and 1000 meter run improved by 24.17%, 26.22%, 11.97% and 16.76% respectively.

Judge et al., (2011) planned a study to assess the main contributing factors in the improvement of maximum distance of shot put performance on track and on field. In the past studies, it was observed that 1 repetition maximums i.e. 1RMAs were associated with the performance of shot put. A survey tool was constructed for data collection and shot put athletes of national level from US colleges were surveyed. After doing Bivariate correlations, it was found that there was significant correlations between personal best spot put and squat 1 RM among females and males.
participants of this study. Female heights were found to be significantly correlated with best shot put throw, however no such correlations were observed in male participants. The findings of this study can provide information with respect to obstacles and barriers faced by the shot put athletes of US.

The primary aim of this study by Balas and Bunc (2007) was to evaluate a possible influence of climbing on young children's (7-9 years, n=93) static strength, muscular endurance and balance in a 10 week program within the school physical education curriculum. The fixed factor multi way 2x3x2 analysis of covariance (treatment teacher x out of school activity) with a pre test and body mass as covariates was used for the statistical analysis. These results suggest that climbing activities may partially contribute to the improvement of static strength and muscular endurance. On the other hand, frequency of climbing activities for 45 minutes twice a week in school conditions does not cause a sufficient stimulus to improve static strength and muscular endurance.

This study was aimed at investigating the changes in performance of shot put, neuromuscular activation of lower extremities, and muscular power between competition and preseason period in skilled shot put athletes by using rotational technique. The performance of shot put was assessed in the beginning of pre season period and after twelve weeks during competition period in 9 shot put athletes. Electromyographic activity (EMG) of right vastus lateralis was noted in all the shot put trials. Mechanical parameters and 1 RM i.e. maximum squat strength while CMJ i.e. countermovement jump on force platform were recorded at pre season and competition period. It was observed shot put performance improved 4.7% i.e. p<0.05, whereas 1 RM squat was found to be improved by 6.5% i.e. p<0.025. Also, EMG activity at delivery phase was found to be significantly improved i.e. p<0.025 after training period. It was observed that shot put performance was related significantly with the take off velocity and muscular power during CMJ at competition period i.e. r=0.66, p<0.05 and 0.70, p<0.05, but not significantly related to maximum vertical force. However, 1 RM squat was not found to be significantly related to the shot put performance. The obtained results suggested that the muscular power of lower extremities was a much better predictor of shot put
performance (rotational) as compared to absolute muscular strength in skillful athletes, mainly during competition period.

Exercise and relaxation are employed in hypertension treatment. However, although post exercise hypotension has already been extensively reported, the effects of acute relaxation and the association of exercise and relaxation on post intervention blood pressure are still unknown. To study this aspect, Santaell et al., (2006) submitted 14 normotensives and 16 hypertensives to 4 experimental sessions, relaxation (20 min); exercise (ex cycle ergometer, 53 min, 50% Vo2 peak); exercise plus relaxation and control (c-73 min rest). Blood pressure was measured before and after the interventions at baseline and during the stroop test. Systolic and diastolic blood pressure decreased significantly after all the interventions, and blood pressure fall (-13 and -7 mmHg, respectively) observed in the experimental session were significantly greater than in the other sessions. Moreover, systolic and diastolic BP decreases in HT (-10 and -4 mmHg) were significantly greater than in NT. During mental stress, systolic BP increased significantly as similarly seen in all the experimental sessions. Diastolic BP also increased during stress; however these increases were significantly greater in the RX session than the other ones. Thus at the end of the mental stress diastolic BP was significantly lower in the EX and Ex+RX sessions than in the control and RX sessions. In conclusion, in NT and HT, a single bout of exercise or relaxation has hypotensive effects, which are enhanced by their association, and are greater in HT. Moreover, previous exercise performed alone or in association to relaxation decreases BP during mental stress.

48 boys and girls, 10-11 years, classified as impulsive or reflective were randomly assigned to one of three modeling groups or a control group. the modeling strategies included: silent model, verbal model and verbal model with self instruction. The task was a motor skill obstacle course in which both speed and errors were scored. Data were analyzed by a 2 x 4 (cognitive style x model type) MANOVA with the number of trials to criterion, the average amount of time on the 3 trials after criterion as the dependent variables. The results indicated that the REF children performed more accurately (took fewer trials to criterion and made fewer errors per trial) than did the IMP children. There were no difference in time scores. A cognitive x model type interaction revealed that IMP subjects made significant more errors than REF
children when performing without a model. Further, the IMP children performed equally as well after observing a silent or verbal model, or after observing a verbal model and participating in self instruction. The REF subjects performed equally as well after observing a silent or verbal model and slightly better with a verbal model plus self instruction. It was concluded that the modeling process is essential for IMP children and should be adjusted in an attempt to make the learning environment compatible with the learning of the child.

Sunitha and Prasad (2006) analysed the effect of pranayama on lung functions and serum cortisol levels in asthma patients. The study was conducted on 82 perennial asthma patients (48 male and 34 female). Seasonal asthma patients and those using cortisol therapy were exclude from the study. 18 asthma patients (9 male and 9 female) were considered as a control group. The experimental subjects were taught rechaka puraka with kumbhaka, suryachandra bedha, suryachandra bedha with kumbhaka for 45 minutes followed by shavasana for 15 min every day for a period of six months. Spirometry was recorded initially, repeated once in every 15 days for a period of six months. Serum cortisol was assessed initially, after 3 months and 6 months respectively. The drug score was recorded once in every month. Results showed that there was a significant improvement in lung functions and also an increase in serum cortisol levels during the period of study only in the experimental group. The drug score had reduced and the symptom score also had showed a positive improvement. There was a sense of well being in all the patients after 6 weeks of pranayama practice. Thus, the present study had showed that the practice of pranayama can be adopted for asthma patients for their improvement.

Man irrespective of age, caste, creed or socio-economic condition faces a lot of problems throughout his life. The present day children especially those belonging to the poor families are under greater stress. When children are taught to cope with stress early in life they attain greater success. The development of physical, psychological and psychosomatic ailments is also reduced. Yoga vidya pranic healing is a type of program that can be used in children (Hegde et al., 2006). It was done for a group of 29 students from 7th class. The sessions were conducted for ten days. Assessments were carried out before and at the end of the study. The sessions included simple yoga exercises, simple breathing exercises, and chanting of the
mantra OM and listening to it. Senior pranic healers carried out pranic healing simultaneously. The parameters assessed include perceived stress scale, Teacher Rutter’s scale, general medical checkup, pranic energy measurements and students feedback. To evaluate the data, the following non parametric statistical methods namely McNemar test, chi square distribution, Binomial distribution and percentages have been used. Very significant improvements (p<0.001) were seen in Pranic energy measurements. The perceived stress scale, Rutter scale and feedback from the students.

Most of people are of the opinion that yoga is nothing but physical activities, breathing exercises. However, research studies indicated that yoga has therapeutical aspects also which can be utilized for restoring physical and mental health. Regular and proper yogic practices help to solve many problems, concerning memory and concentration, which majority of the students are facing every day. Taking inspiration for the news number of the students committing suicides in Japan is increasing at alarming rate, a project named medha sanskar was prepared and successfully implemented. Medha means memory and sanskar means educating, training polishing. So medha sanskar means training and polishing the memory. The present study was planned to explore memory along with non verbal reasoning. The training was planned using medha sanskar. Medha sanskar is a module for sharpening memory, as the name suggests, specially designed for students of 9th to 12th standards, combining the principles of positive auto suggestions and yoga developed by yogacharya Shrikrishna Vyavahar. It is a week long programme, one hour every day. Since 1986 it was used for various student groups, total number reaching 48000. Students studying in 9th standard in vernacular medium school in the city of Thane were selected as a study sample. Index group consisted of 45 students who attended medha sanskar module for one week (1 hour every day) and one weekly session for the next 2 weeks or it was conducted as one day session of 5 hours. The control group, consisted of 61 students, was not exposed to any intervention. Both the groups were assessed using the following tests before the intervention, after 2 months and at 4 months. The battery of test consisted of 1) non verbal test of intelligence, 2) Rey Osterreith figural memory test, 3) Memory for the passage and 4) Continuous performance test. A controlled study of 9th standard students evaluating the efficacy of medha sanskar indicates a significant improvement in the scores on
sustained attention, non verbal reasoning and figural memory. Girls from the experimental group had significant improvement in their scores, as compared to boys from that group, on sustained attention and non verbal reasoning.

Subjects were 78 4th grade and 80 5th grade students from 8 classes in 2 ELE schools (Edwards, 1986). Two 4th and 5th grades received standards in a 1 week exp teaching unit, and two did not. A Solomon 4 group design was used. The data were analyzed in a treatment (standard no standard) x pre (pre-no pre test) x sex (male-female) x grade (4th-5th) MANOVA using post test and motor appropriate trials as the dependent measures and was followed up by 2 separate ANOVAs. r’s between behavior patterns and performances were also computed. As expected, the treatment group was better than the control group, boys better than girls and 5th graders better than 4th graders. Subjects with standards performed significantly better than those with no standards. The pre x treatment interaction suggested that having a pre test tends to standardize the amount of practice a child takes. there was a positive r between motor appropriate practice and performance regardless of treatment group. these data suggest that performance can be improved by individual performance standards and that care should be taken in using pre and post test methods for testing motor skill.

Effects of an 8 week strength training program relative to isometric strength, isokinetic strength, anaerobic power and anaerobic capacity was examined. Male subjects (n=25) enrolled in a PA state university strength training class acted as the experimental group, whereas male subjects (n=13) who refrained from strength training served as the control group. the training program included 13 Nautilus exercises executed 3 days per week over an 8 week period. Physiological measurements were taken prior to ad following training; ANOVA and t tests were used to test for significance. The experimental group experienced increases in isokinetic leg extension strength (60, 120 and 180 degrees per second) while being significant difference from the control group. anaerobic power (Margaria-Kalaman power test and Wingate Anaerobic test), and body weight did not increase significantly. Both groups demonstrated increases in isometric leg extension strength but the difference between the groups was not significant. The pre test correlations between isokinetic leg extension strength and anaerobic power (Wingate, r=0.24;
Margaria-Kalaman, \( r=0.23 \) and isokinetic strength and anaerobic capacity \( (r=0.23) \) were positive but not statistically significant. The results of this study reinforce that isokinetic strength, anaerobic power and anaerobic capacity are separate physiological potentials.

One’s ability to extract oxygen from the air and provide it to the working muscles is an important consideration in determining the physical working capacity (Andrews, 1988). Many investigators have recognized this and developed techniques to measure \( \text{VO}_2 \). The laboratory treadmill test is an accepted method of \( \text{VO}_2 \) testing, and the tethered swim test has also been used in recent years to measure this parameter. Women’s physical working capacity has not been evaluated to a great extent, especially with a swimming ergometer. The physiological data on 11 untrained women subjects resulting from tests with the treadmill and tethered swim were compared. Testing was done in the laboratory and university pool in randomized order. Expired air was collected in 1 min samples in meteorological balloons and analyzed for oxygen content using a Beckman Field lab oxygen analyzer. HR, VE, and \( \text{VO}_2 \) were recorded for each test. The data were treated statistically using a t test for related measures and all data were found to be significantly different for the treadmill and swim tests. It was concluded that a tethered swim test could be used for max \( \text{VO}_2 \) screening in certain situations if a correction factor of 1.2 was applied to the swimming data.

Fifteen four and five year old preschool children from a university lab school participated in the study carried out by Geyer (1988). The experimental group consisted of eight subjects who participated in a six week, three day a week, 10 minute a day structured motor skill developmental program. The control group did not participate in any structured motor skill development program, but did take part in a six week, 3 day a week, 10 minute a day structured play period. Pre and post assessments were conducted for static balance, dynamic balance, jumping distance, and level of performance of the standing long jump to determine if there was an improvement as a result of the program. A 2 way ANOVA with repeated measures of static balance, dynamic balance, jumping distance, jumping level test scores resulted in significant F ratio for the experiment and control group. for 3 of the 4 skills tested, the experimental group improved significantly. The results of the analysis for dynamic balance indicated both groups improved significantly. The investigator feels this
could be due to the low number of subjects and the low discriminating power of the test.

Koceja (1989) tested 24 subjects (12/group) using a conditioning reflex protocol, utilizing intervals of 10, 25, 40, 55, 70, 85, 100, 115, 130 and 145 msec between the conditioning stimulus and the test reflex. Specifically, the patellar tendon tap reflex (PTR), the Achilles tendon tap reflex (ATR) and the tibial nerve Hoffmann (H reflex) reflexes were examined in this study. Nine experimental treatments were administered to each subject on five test days. The experimental treatments included conditioning the test reflex with a prior tendon tap and or tibial nerve H reflex stimulus. For each treatment, three trials were administered at each of the conditioning intervals, and three unilateral control trials were also administered. The following dependent means were examined: peak isometric force, isometric impulse, contraction time, force latency, EMG latency, electromechanical delay, peak to peak EMG activity, integrated EMG activity and half relaxation time. Significant (p<0.05) between groups difference were noted for the unilateral PTR, but not for the ATR or the H reflex. A conditioning stimulus caused changes in the dependent means for all experimental conditions, and the recovery profiles between the groups were different. It was concluded that exercise affects the integration of segmental reflexes in humans.

The effect of warm up on performance of the 440 yard run was determined. Subjects were 8 male and 16 female undergraduates chosen from foundations of physical education classes at Auburn University (Carroll, 1987). Subjects were divided into warm up and no warm up groups with each subject participating in each group and acting as his own control. While the no warm up group sat on the side of the track, the warm up group jogged 5 minutes around the outdoor track, stopped and took HR for 15 seconds. If heart rate was 106-118 bpm for males or 138-150 beats per minute for females, subjects rested 5 minute and then ran 440 yard in groups of 6. While the warm up group rested, the no warm up group ran 440 yard in groups of 6. Testing was conducted over a period of 6 days with each condition being met 3 times. A paired sample t test was used to determine if a significant difference existed between the 2 test conditions. Results showed: no difference between times of warm up and no warm up conditions for combined groups, no difference in times for warm up and no warm up conditions for females, and a significant difference between warm up and no warm up conditions for males.
This investigation by Turner (1989) examined the effects of mental imagery, relaxation, and physical practice on tracking skill acquisition. The influence of the independent variables, alone and in combination, was assessed on a 30 sec pursuit rotor task using the nondominant hand. 8 female undergraduate at Indiana university were assigned to conditions of different combinations of physical practice, mental imagery, relaxation, and control. Each subject received fifteen 30 second trials of experimental task performance, and each trial was separated by a 30 second rest period. Subjects in the physical practice conditions completed five 30 second trials of the experiment task prior to the actual testing sessions. The mental imagery groups received 15 30 second trials of imagery of the criterion task. Subjects in the relaxation groups were taught to relax prior to the experiment sessions. The physical practice mental imagery subjects received five 30 second physical practice trials, followed by ten 30 second mental imagery sessions. Time on target was grouped into 5 blocks of 3 consecutive trials for analysis. Data were analyzed a 2x2x2x5 factorial model. A significant (p<0.5) practice main effect was found, with the physical practice group outperforming the no physical practice group. A physical practice mental imagery interaction effect (p<0.05) also occurred, with the physical practice mental imagery group outperforming no physical practice mental imagery group. A trial block main effect (p<0.05) was found, with performance on block 5 performance being greater than that of all other blocks. Finally, a physical practice by block interaction (p<0.05) occurred, with physical practice subjects outperforming the no physical practice subjects on each block. It was concluded that prior physical practice alone facilitated learning of pursuit rotor target tracking, physical practice and mental imagery combined was an effective method of motor skill acquisition. Relaxation training, alone or coupled with physical practice and or mental imagery did not affect motor skill acquisition.

The purpose of this investigation by Kritpet (1988) was to determine the effectiveness of a six week strength training program consisting of squat and plyometric exercises on vertical power jump performance, static and dynamic muscular strength, and muscular power production in college age adults. 15 male and 2 female college students in an advanced weight training class at the Oregon State University served as subjects for the study. 9 subjects trained only with squat exercises whereas 8 subjects trained with combined squat and plyometric exercises.
All subjects trained twice a week for six weeks. A pre test and post test randomized groups design was utilized in this study. The statistical analysis was conducted using a paired t test and a repeated measures ANOVA. A 0.05 level of significance was selected for rejection of the null hypothesis (p<0.05). The results of the training program indicated a significant increase (p<0.05) from the pre test to post test for the vertical power jump within the combined squat and plyometric training. Static strength significantly decreased (p<0.05) from pre test level to the post test level within the squat training program. Hamstring strength and hamstring power were significantly differed (p<0.05) within both training program when pre test and post test mean scores were compared. However, no difference existed between the gains achieved by the two training program. The results of this study will assist physical educators and coaches in designing more effective training program both at the high school and college level.

Papa (1988) tested 33 volunteers from the slippery rock University track and field team for muscular strength and endurance performance under the conditions of stimulative, sedative and non musical environment. The 3 testing periods were completed in a one week period. An ANOVA for dependent samples was used to investigate the difference in muscular strength scores among the three types of musical stimuli. A Scheffe’s multiple comparison test was used to investigate which of the mean difference. A Friedman ANOVA for dependent samples was utilized to investigate the difference in muscular endurance scores among the 3 types of musical stimuli. It was concluded that muscular strength scores increased significantly (p<0.05) when subjects listened to the stimulative music condition as compared to the sedative and non musical conditions. There was no significant difference in the muscular endurance performance capacities of the subjects between the stimulative, sedative and non musical conditions.

An investigation of how sport, gender, and class affected athletes perceptions of a distinct collection of personality traits which comprised their ideal coach was undertaken (Elmore, 1985). 402 high school athletes, ages 15 to 18 yrs participating in baseball, softball, golf, and track and field were utilized as subjects. Each subject competed a personal information questionnaire (PIG) and the Cattell, 16 PF profile form. The dependent variable was the athletes perceptions of ideal coaching
personalities. Data were collected over a 4 week period at Eastern south eastern Washington state class A AA high school during the spring of 1985. A randomized complete block design with a 3 way 4 x 2 x 2 ANOVA was utilized to determine differences between the subjects responses based upon their sport, gender, and class. A LSD test was employed for multiple comparisons. A distinct collection of ideal coach personality traits was observed. Differences in the athletes perceptions were not observed when compared by sport (p<0.05) but were observed when compared by gender and class (p<0.05) significant differences were observed leading to the conclusion that sport, gender, and class affect athletes perceptions of an ideal coaching personality.

A movie film of the triple jump was projected, and body parts were plotted by dots. The distances from the dots to a baseline were measured, and the distances were displayed graphically (Adams, 1988). Conclusions were: the last step was both lengthened and shortened. The take off foot landed heel first. The 3rd take off angle was greatest; the 2nd was smallest, except for 1 subject. The lead extremities were elevated most in the 3rd take off, and least in the 2nd take off. Forward lean changed constantly and increased more in successive flights. Parallel coordination of the arms and the lead leg was recommended. Transfer of momentum from the lead extremities was enhanced by a high posterior starting position, and a high anterior elevation that was terminated at the end of the take off. Newton’s 3rd law of motion was used twice to place the legs in landing position in the 3rd flight.

An instructional videotape unit including teaching progressions, cues, and support drills for both styles of shot putting was developed and validated using 69 junior and senior high school and college coaches, both male and female, who attended the opening session of the BYU track and field coaches clinic on January 23-25, 1986. The coaches at the clinic took a test to assess their knowledge of long jumping, hurdles, and shot putting, followed by the instructional videotape unit and a follow up test (Robinson, 1986). All questions were multiple choice and answers were marked on a computer scanned answer sheet. A simple t test was used to evaluate the mean difference between the first and second test for each of the 3 events. The mean difference between test 1 and 2 the hurdles was 5.4%. In the long jump it was -0.8%, and in the shot put it was 27.11%. only the difference in the shot put was significant, resulting in the conclusion that the videotape unit was effective.
Woodard (1988) accumulated and assessed data regarding the reliability of an electronic hand dynamometer as well as determining a grip strength profile for Texas high school male. The 50 right handed volunteers who served as subjects were 15 year of age. Data were collected at A & M consolidated high school in college station, Texas. A Jamar model 2 A electronic hand dynamometer was used to collect the data. The subjects grip strength was tested 3 times with each hand on successive days. The mean for each hand was determined from the trials each day and the results were analyzed to determine: a) to what degree the derived mean correlate, b) what was the grip strength of 15 year old male. The results were determined by the use of a microcomputer and accompanying software. A Pearson product moment $r = 0.946$, $p<0.01$, for the nonpreferred hand and $r=0.954$, $p<0.001$, for the preferred hand were found. It was also determined that the subjects had a mean grip strength of 97.32 lbs (SD=22.5) with the preferred hand and 90.50 lbs (SD=21.7) with the nonpreferred hand.

48 male subjects were assigned randomly into 2 treatment groups. Group A used 5 upper body Nautilus machines performing 1 set with 10-12 repetitions at each machine. Group B trained with 3 freebar upper body exercises consisting of 4 sets of 4-6 repetitions on the bench press, 3 sets of 4-6 repetitions with the military press and 3 sets of 4-6 repetitions with dips. The no. of repetitions were equal in both treatment programs. Based on the ANOVA tests, the following conclusions were made: both Nautilus and freebar strength training programs were effective in causing strength gain; the Nautilus and freebar strength training programs as utilized and evaluated in this study did not yield significantly different strength gains, and the training modality used to increase strength is not of critical importance. The crucial factor is the amount of resistance present in the training program.

Carlton (1989) investigated gender mediated environmental factors which may be associated with difference in female and male throwing development. Subjects were 80 children (42 female, 38 male) ranging from 3 to 5 year of age ($M=4.4$ year) and their parents. The development of children's overarm throwing patterns was evaluated using Roberton's five part component model. Environmental factors investigated focused on opportunity sets available to femal and male to develop throwing skill. A questionnaire administered to parents determined information regarding parents engagement with children in gross motor play, provision of gross
motor toys, attitudes conducive to sport participation and skill development for female and male, involvement in sport or recreational activities, and masculinity and femininity. Information regarding children’s participation in sport or movement program, and the presence of an older sister or brother in the home were also determined from the parent questionnaire. Children’s play preferences were ascertained from children’s responses to illustrations of physical, social or cognitive play activities presented in a fixed pairs comparison format. Results indicated that male on the average were more advanced in throwing development than female. Regression analysis revealed relationships between children’s throwing development and several environmental variables. Regression analysis revealed participation in sport and movement program and having an older brother to be the best predictors of female throwing development: father’s sport involvement and father son sport skill play were the best predictors of male throwing development. Implications were discussed in light of the necessity of recognizing social factors in evaluating difference in female and male throwing development.

61 subjects, 37 males and 24 females, participated in a study comparing 6 treatments of training (control, interval underwater swimming, interval breath holding, circuit training, cycle breathing, and drown proofing) upon breath control, breath holding, and under water effectiveness. Subjects were assigned to groups by the time of day they could participate in the study. The groups were randomly assigned to treatments. All subjects were pre tested, trained for 5 weeks, and post tested. It was found that the 5 groups of experimental subjects (interval underwater swimming, interval breath holding, circuit training, cycle breathing, and drown proofing) were significantly better in improving breath control, breath holding, and under water effectiveness than the control, where p<0.05. Of the 5 experiments treatments, interval breath holding was the least effective in improving breath control and under water effectiveness. The females had greater gains in under water effectiveness than the males.

Dvorak (1987) determined the effects of strength training on endurance performance during cycling and running in well trained subjects. Six subjects participated in a heavy resistance exercise program (3 days/week for 10 week) that was designed to strengthen the lower limbs exclusively. All subjects prior to the start of the strength phase, had attained a steady state level of endurance, and continued to follow the
same endurance regime during the 10 week strength phase. Following the combined strength and endurance training, no significant changes occurred in body weight, % body fat, or thigh girth. Average strength (parallel squat, knee extension and knee flexion) increased 34%. There was no further improvement in VO2 max during cycling or treadmill running when expressed in absolute or relative terms. Short term endurance performance during max exercise tests increased 14% during both cycling (353 ± 13 to 404 ± 21 sec) and treadmill running (365 ± 21 to 416 ± 27 sec). Long term endurance improved during cycling to exhaustion (from 71 ± 8 to 81 ± 8 min). Although there was an overall improvement of 52 sec during the 10K running tests, 1 S who was the fastest runner (10K = 35 min, 48 sec) and had the highest VO2 max (66.9 ml/kg/min) did not improve. In 3 subjects in which biopsies of vastus lateralis muscle tissue was obtained, citrate synthase activity was decreased by 11% following the strength and endurance training. These results indicate that there is a complete absence of any negative effects of adding strength training to a regular program of endurance in well conditioned individuals. While strength and short term endurance both increased significantly, the magnitude of the increases were less when compared to training exclusively for strength. These results indicate that strength training does not consistently increase long term running performance, but appears to induce a consistent improvement in long term cycling.

24 young adult male subjects were studied to determine the relationship between caloric costs of walking or running a mile and the speed of movement, and between those costs and the fitness level of the individual (Fellingham, 1988). Development of regression equations to predict caloric costs based on body weight, speed of movement, and VO2 max are inversely related at a given running speed. Equations were generated to predict the caloric cost of walking or running a mile. The independent variables for the walking equation included body weight and speed squared x body weight (r= 0.86). The independent variables for the running equation were identical to the ones used in the walking equation with the addition of speed x VO2 max (r=0.62).

The effect of the 10 and 11 feet basket height upon rebound area was studied. 36 subjects were selected according to body height, player position and skill level (Lamph, 1988). A total of 14,100 rebounds were collected at each of the 2 basket heights. Data were collected and subjected to either chi square analysis or
hypotheses tests for proportions to determine significant differences between basket height and its effect upon rebound area. Results showed that when all of the rebound arcs are combined, there is a difference between the effect of the 10 and 11 feet basket on rebound area. Shooting location and player position also have some effect upon rebound areas when shooting at the 10 and 11 feet baskets; however, from practical statistical viewpoint, elevating the basket to 11 feet would have little effect upon rebound area in game situations.

To determine whether or not the magnitude of improvement in athletic performance and also the mechanisms driving these diversifications take issue in comparatively weak people exposed to either trajectory power coaching or significant strength coaching (Cormie et al., 2010). Relatively weak men (n = 24) WHO may perform the rear squat with skillful technique were irregular into 3 groups: strength coaching (n = 8; ST), power coaching (n = 8; PT), or management (n = 8). Coaching concerned 3 sessions per week for ten wk within which subjects performed back squats with 75%-90% of one-repetition most (1RM; ST) or maximal-effort jump squats with 0%-30% 1RM (PT). Jump and sprint performances were assessed moreover as measures of the force-velocity relationship, jumping mechanics, muscle design, and neural drive. Both experimental teams showed important (P < or = zero.05) enhancements in jump and sprint performances once coaching with no important between-group variations evident in either jump (peak power: ST = seventeen.7% +/- 9.3%, PT = 17.6% +/- 4.5%) or sprint performance (40-m sprint: ST = a pair of.2% +/- 1.9%, PT = 3.6% +/- 2.3%). ST additionally displayed a big increase in peak strength that was considerably larger than the atomic number 78 cluster (squat 1RM: ST = thirty one.2% +/- 11.3%, PT = 4.5% +/- 7.1%). The mechanisms driving these enhancements enclosed important (P < or = zero.05) changes within the force-velocity relationship, jump mechanics, muscle design, and neural activation that showed a degree of specificity to the various coaching stimuli. Improvements in athletic performance were similar in comparatively weak people exposed to either trajectory power coaching or significant strength coaching for ten wk. These performance enhancements were mediate through contractor diversifications specific to the coaching information. the flexibility of strength coaching to render similar short enhancements in athletic performance as trajectory power coaching, in addition to
the potential long advantages of improved peak strength, makes strength coaching a more practical coaching modality for comparatively weak people.

Male subjects (n=32) were randomly assigned to a control group and to an experimental group (Lanford, 1986). The experimental group participated in a strength program and a schedule of practice and play for 10 weeks. The control group engaged in a program of practice and play for 10 weeks. All subjects were given pre and post tests as follows: 1 repetition max of the bench press, grip test for right and left hand grip strength, drive test for distance and accuracy, and an approach test for accuracy. An ANOVA, t test and a correlation coefficient analysis were used to test for significant results. The following conclusions were drawn: strength training increases the distance of the golf drive, there is no evidence that strength training has a harmful effect on the accuracy of the golf shot, and golfers who lack sufficient distance with their drive should engage in strength training.

By means of electromyography, this study investigated the action potentials of the biceps brachii, latissimus dorsi, anterior and posterior portions of the deltoid, sternal portion of the pectoralis major, and the long head of the triceps brachii during the pull up with both supinated and pronated grips, push up, parallel dip, combined shoulder flexion with elbow extension, and the bench press. With the aid of electrogoniometry, the action potentials were related to joint changes in the shoulder and elbow joints. Subjects included 6 university male students who were skilled in the techniques of weight training exercises. It was found that action potential recordings of the active muscles were higher during the antigravity phase than the gravity phase; less energy was required from a muscle to maintain a static position than to produce or control movement, and the strength of the contraction was dependent on the amount of resistance to overcome.

Miller (1988) determined if relaxation exercises, prior to performance, would have a significant effect on athletic performance among all or among the starting 5 female JV HS basketball players. Specifically, the anxiety levels and athletic performance of basketball players who practiced breathing exercises prior to 10 games were compared to the same female basketball players who practiced no relaxation prior to 10 difference games in the 1987-88 season. The data for this study were collected by admin the competitive short form of the state anxiety inventory, and recording their athletic performance as measures by turnovers, field goal shooting
percentages, free throw shooting percentages, and win/loss percentages. Data were evaluated by means of 5 t tests and 1 descriptive comparison. 3 of the 6 areas analysis were significant. Those areas were team anxiety level, turnovers, and win/loss percentages. 2 areas, team free throw shooting and field goal shooting were not significant. 1 areas, starting 5 players anxiety level, was not significant, but, the t value approached significant, meaning that there was a tendency that breathing exercises had some effect on starters. Based on these results, this study was supportive of previous studies findings. Relaxation exercises prior to performance are a significant help in improving athletic performance.

The relationship between self concept and the ability to learn a novel motor skill was examined. 301 8th grade female physical education students were given a self concept test. From these scores, 1 group was labeled high and 1 group was labeled low self concept. Both groups were given an adapted Dyer backboard tennis test as a measure of their ability to learn a novel motor skill. The initial and final novel motor skills test of 6 trials were compared. Using the 0.01 level of confidence, it was found that both groups improved significantly between their initial and final novel motor skills test. However, there was no significant difference between the 2 groups on the initial novel motor skills test, but the greater gain was within the high self concept group.

To determine if there were significant differences in body image scores between women competing in intercollegiate sports compared to women who were non-competitors, 42 college women athletes and 45 women in 2 physical education activity classes were studied (Wallace, 1998). Darden’s body image discrepancy test was selected as the instrument to test the null hypothesis. Existing body image scores of the women athletes and non-athletes were compared on a % basis and by using a chi square test. Results supported the null hypothesis for the factors of ideal body image and body image discrepancy. The null hypothesis was rejected for the factor of existing body image. Women athletes had a existing body image which was significantly different from the existing body image of women non-athletes. Results indicated that, as a group, women non-athletes were closer to perceiving themselves as most feminine than were women athletes. However, women athletes, as a group, perceived themselves as being closer to their ideal body image than did women non-
athletes. The ideal body image of both groups was similar and indicated possible changes in the American woman’s concept of femininity.

Sports, games and physical exercises require active involvement and participation by the motor cortex for developing skill, co-ordination, efficiency, alertness and top performance. On the other hand, more importance seems to have been given on sensory tonic activity rather than motor activity in yogasanas which can lead to the indirect training and education of the visceral organs and neuro vegetative system rather than the extremities (Bhole, 1977). The essential features of meditative asanas are broad triangular base provided by the two knees and buttocks and a straight and balanced condition of the spine. Relaxative asanas are claimed to give rise to chitta vishranti i.e. tranquility and peace. Corrective asanas are supposed to develop stability, steadiness and lightness of the body.

Gore and Gharote (1987) selected twelve healthy subjects from Police training school and were tested on collins spirometer for Respiratory Rate (RR), Oxygen Uptake (OT) and Minute ventilation (MV) before, during and after one minute Kapalabhati (KB). Further, expiratory reserve volume, inspiratory capacity and vital capacity was assessed before and kapalbhati. Minute ventilation, respiration rate and oxygen uptake revealed significant increase during kapalabhati whereas total volume was reduced. No significant changes in the respiratory volumes were observed after the performance of one minute KB. However, the oxygen uptake was seen significantly reduced after one minute of KB as compared with the values during KB. It was also less than in the initial normal breathing.

84 men, average age 27 years, were tested 2 times each on a treadmill. On the 1st visit a multi-stage exercise test was administered (Warner, 2000). For the 2nd test, subjects were randomly assigned to 1 of 4 prior exercise treatments: no PE, 25%, 50% or 75% of VO2 max average heart rate attained for each intensity were: 83 beats per minute at no PE, 95 beats per minute at PE 25% 131 beats per minute at PE 50% and 165 beats per minute at PE 75%. After 3 minute at the assigned PE, each subject rested 30 second, then ran at the speed and grade which had elicited 96-100% VO2 max on the 1st visit. The time each subject was able to continue was recorded as his score on the endurance task. The overall average time for the endurance task was 318 seconds. The data were analyzed by ANOVA. There were no significant differences among the 4 PE treatments in endurance performance.
VO2, HR, VE and oxygen pulse were compared for each 30 second period of the 1st 3 minute of the endurance task. For the 1st 2 minute of the work, VO2, HR, VE and oxygen pulse were significantly elevated in proportion to the intensity of the PE with the magnitude of the difference diminishing with time. After 2 minute of the task had elapsed, none of the differences of the physiological parameters were significant. Thus, no evidence was produced that a short bout of PE followed by a short rest period enhances endurance performance, even though some degree of mobilization of oxygen transport did occur in the initial stages.

Comparison of one and two minutes practice of Kapalbhati with three and five mins. practice in seven well trained subjects revealed the following differences (Karambelkar& Bhole, 1988). The rate of breathing reduced from 123/min. in the former condition to 118/min. in the latter condition. Minute ventilation was also reduced. Oxygen consumption and carbon dioxide production showed an increase in the latter condition indicating more exertion. From yogic point of view Kapalbhati of longer durations may not be recommendable. However, one may think of performing Kapalbhati for longer periods for improving cardio-respiratory endurance.

The function of selected abilities and cognitive strategies in learning a pursuit rotor task under different task situational constraints were investigated, using a combination of co relational and experimental techniques (Inomata, 2001). Female college students (n=130) were equally assigned to 4 groups: control, reference, speed, and accuracy. All groups were administered selected pre-ability tests. Then subjects in the reference, speed, and accuracy groups practiced the pursuit rotor task under different conditions: non emphasis, speed emphasis, or accuracy emphasis. The control group was not permitted to practice the task. After practice periods, the reference, speed, and accuracy groups were administered a questionnaire in regard to the learning strategies they used. The control and reference groups also received post ability tests. Results indicated that there was no significant transfer effect of learning the skill on the selected abilities. The correlational relationships between the selected abilities and cognitive strategies were not significant. The function of the strategy factors in learning were differentiated under the instructional trade off conditions (speed or accuracy
emphasis). No differential functions were observed with regard to the ability factors and learning situations.

Reproduction of a criterion fore following a interval during which the subject was required to exert an interference force either 10 lbs greater or less than the criterion was examined (Ellis, 1999). A criterion force of 50% of max grip strength was exerted. This was followed by an interval of 40 sec duration during which the subject exerted an interference force of 10 lbs greater or less the criterion. 36 subjects recorded 2 max trials, followed by 10 sub max reproduction trials that included the criterion, the interference, and then the attempted reproduction of the criterion. All strength assessment was recorded on a cable tensiometer with a T-5 orthopedic testing attachment. Constant and variable error scores were analyzed with separate factorial design ANOVAs. Neither the direction nor the placement of the interference force significantly affected the reproduction of the criterion.

Ganguly and Gharote (1988) conducted a study with a view to see the effect of Yogic training on Endurance and Flexibility. The study was conducted on 70 students of the Regional Police Training School, Khandala from which 35 students were assigned to each of the Experimental and Control groups. Significant lowering of the sitting pulse rate was observed in the Experimental group as compared to the Control group. The Cardio-vascular endurance as judged by the Harvard Step Test improved significantly in the Experimental group. Although mean increase in the Toe Touch Flexibility was observed in the Experimental group, it did not reach the expected statistical significance.

176 7th and 8th grade boys and girls from Briggs Middle school in Springfield, or participated in this study (Harris, 1984). Data were generated from subjects responses to a physical fitness self efficacy scale and from performance on a 4 item physical fitness test. Treatment of the data were performed using 3 correlated t tests to test the hypothesis that there would be significant pre test to post test difference with each group; one way ANCOVA to test the hypothesis that different modes of teaching fitness skills enhance self efficacy would be associated with different changes in performance, and determine the relationship between self efficacy and performance. The primary findings were: subjects in the 2 goal setting groups significantly increased their physical fitness self efficacy, whereas subjects in the
control group did not; subjects in the proximal sub-goal group had a significantly higher level of physical fitness self efficacy than did subjects in the other groups; all three groups improved their mean post test fitness level from their pre test level, but the difference between the groups were not significance and there was a significant relationship between self efficacy and fitness performance in each group.

Bera, Ganguly, Jolly and Gharote (1998) examined the effects of three-year Yogic exercise programme on motor functions of school boys, ages 10-13. Variables tested were cardiovascular function, body fat percentage, abdominal muscle strength/endurance, flexibility, balance and grip strength. The subjects participated in the selected Yogic exercise programme 3 days week' with 45min. day' for consecutively three years. Results indicate that performance on all variables was significantly improved (p < 0.01) during the course of study. A comparison of Yogic exercise subjects with a comparable control group revealed significant interaction between treatment and time on all variables except grip strength. During three-year period of experiment, pretest to posttest scores of the yogic exercise subjects tend to improve progressively with faster rate over the scores of control subjects.

The relationship between lower extremity alignments and the shin splint syndrome in female athletes was examined (Lilletvedt, 2000). Selected measures describing the alignment of the lower extremities of 32 women athletes were taken. Data recorded were classified into: group 1-a no shin splint group; group 2-1 current moderate subjects group; group 3-a current severe subjects group; group 4-a previous subjects group; and group 5-a current subjects group. data were analyzed through the use of ANOVA, Duncan’s test, and a stepwise regression. ANOVA revealed significant alignment differences (p<0.05) between subjects who had no subjects, subjects who had subjects previously, and subjects who currently had subjects. The Duncan’s test indicated that 15 measures varied significantly (p<0.05) between the no subjects group and the current subjects group and between the no subjects group and the previous subjects group. 11 of the 15 measures varied significantly between the previous subjects group and the current subjects group. the step wise regression indicated that 6 of the 15 measures taken could be used to predict the occurrence of the subjects syndrome. The 6 predictive factors included: the degree of external rotation of the femur with the hip extended, the degree of dorsiflexion of the ankle
with the knee both flexed and extended, the degree of inversion at the subtalar joint, the frontal plane position of the tibia/subtalar joint static, and the position of the calcaneus in relationship to the floor/subtalar joint static.

The word fitness has been interpreted to mean different thing to different people. In this sense we are also familiar with the word total fitness and the physical fitness is one aspect of this fitness, which depends upon the efficiency and proper functioning of the whole body systems. Performance of sports person in any field depends upon various factors related to various disciplines like mechanics, physiology, psychology, sociology etc. However, age sex and physical growth also influence the human performance, which is also considerable affected by maturity status of an individual. Although the age, height and weight play a vague role in the determination of human performance but these factors can never be ignored. The objective of this study was to find out the actual relationship of age, height and weight with the selected performance related variable of female track&field athletes (Rai & Rai, 2012). This study has been conducted on 41 track and field athletes, aged 17-25. Who represented their university in all India inter university athletics meet: including age height and weight in their peak performance level they performed on various standardized tests conducted to measure nine performance related fitness variables. On the basis of statistical analysis it has been observed that almost all the performance related variables were negatively related with age, except flexibility and leg strength all performance variables were negatively related with age except flexibility and leg strength performance related variable were positively related with height. While all performance variables were negatively related with age. Except flexibility and leg strength all performance related variable were positively related with height. While all performance variables were positively and significantly related with height. While on the basis of facts study concluded that the performance in track & field in related variables were decreased due to increase in age after peak performance age. Height had no particular effect or defect in athletes while, body weight do play an important role in almost all the performance variables. If the increase in age was supported by sufficient height and body weight it can be found advantageous for track & filed athletes. Performance related fitness of female Indian University track & field athletes in relation to their age, height and weight.
The subjects were 46 male volunteer college students divided randomly into three groups: physical practice, mental imagery practice, and physical plus mental imagery practice (Trogdon, 1985). A pre test on pitching accuracy was administered followed by three weeks of prescribed practice routines. Subjects threw 60 throws each practice session for a total of 480 throws. A post test followed the training period. The mean gain scores were subjected to dependent t test. An ANOVA determined if significant changes had occurred between groups. A 2 by 3 ANOVA with repeated measures was also utilized. Results indicated all three groups made significant improvements in pitching accuracy but no group was significantly superior to the other groups. This supported earlier research which indicated the use of mental imagery can improve the performance of a physical skill.

The history of the last four hundred years in Europe has been a simultaneous growth in political freedom, economic prosperity, intellectual advancement and social reform; but it has also been a slow and sure decay of traditional religious morality and social order. The other orientation' cultivated through religion and philosophy over the millenia has been lost in just four hundred or less years (Palsane, 1998). The psychological benefits of Yoga include - (1) impulse control, cultivation of an attitude of detachment, gaining control over the excitation and its potential fallout, thereby maintaining neurophysiological balance; (2) meditation is useful in clarifying goals and resolving internal conflicts. Motivational and attitudinal orientation of the prescription in Yamas and Niyamos are such as to take care of most of the stress producing situations in life; (3) Yoga provides a rational and empirical system of thought and living. Anything that causes disturbances can be examined in the light of yoga; (4) in Yoga like modern psychotherapies deemphasising of ego involvement is prescribed for many abnormal conditions, anxieties and stresses; (5) "Freedom from bondage" in yoga signifies one’s liberation from all kinds of fixations and attributes as well as continual feeling of freedom and knowledge.

Effect of four-week daily-practice-programme of 20 minutes Meditation, preceded by 20 rounds of Omkar, on Reaction Time (RT) and selected biochemical and haematological parameters was studied by Bhogal et al., (1999) on ten students (age range: 20-30) of Certificate Course in Yoga (Kaivalyadhama. Lonavla).with a matched group of nine separate students, drawn from the course, as Controls.In
Experimental group, a significant decrease (p<0.01) in Disjunctive R T s-both Visual and Auditory, reflecting an increased rate of Information Processing of complex psychomotor nature, as well as a significant reduction of R.B.C. and a marginal decrease in cholesterol, suggest a direct regulation of ion channels by fatty acids in muscle activity, independent of phosphorylation. In Control group, a significant reduction (p<0.05) in triglyceride and Simple Auditory R T as well as a significant increase (p<0.01) in R.B.C reflects muscle activity of simple psychomotor nature, indicating the phosphorylation-dependent process. However, the changes in differential count, haemoglobin, W.B.C., protein and albumin were nonsignificant.

Vo2 and stride frequency (SF) were measured during treadmill walking at 4.8 and 6.4 km/h under the following treatments: walking, walking carrying 1.36 kg hand weights, and walking with vigorous arm swings carrying the same weights. Subjects, 20 trained men aged 24 to 43 yrs, performed all six treatments in random order for 8 min each during 1 testing session. Subjects rested between treatments until their HRs returned to within 10% of resting values. Values were determined each minute as follows: stride frequency by timing 30 strides, HR from an EKG strip, and Vo2 (ml/kg-min) measured continuously. Data reported were the 7th and 8th min averaged. During walking with vigorous arm swings, Vo2 values were significantly greater and stride frequency values were significant lower (0.05 level, ANOVA and DMR test) than the other two treatments within a speed. Vo2 and SF values were significantly greater for all treatments while the subjects walked the faster speed (0.05 level, dependent t test). Carrying 1.36 kg hand weights increased the energy cost of walking when accompanied by vigorous arm swings. This effect is not evident when hand weights are carried during normal walking. Stride frequency decreases when vigorous arm swings are performed during normal walking.

This study conducted by Mundewadi, Baji, Kamble & Waghmare (2007) designed a study to determine effect of Pranayama on parasympathetic nervous system. Fifteen male medical students volunteered to undergo Pranayama training. At the start of study basal heart rate, expiration/inspiration ratio & lying to standing (30th to 15th ratio) tests were determined. The subjects were given training in Kapalabhati, Yogic Savasana, bhashtrika, nadisuddhi and Bhramari for 45 minute daily for 6 days per week for a duration of 2 months. At the end of training session all three tests were repeated. Results of our study revealed a significant reduction in basal heart rate
and increase in expiration/inspiration ratio & 30th/15'h ratio (standing to lying test). This indicates increase in parasympathetic tone. Thus we conclude that Pranayama training shifts autonomic balance more towards parasympathetic, leading to reduction of stress on heart.

Sultana, Mathew and Vipin (2007) determined the effect of 12-weeks of cycling and pranayama on selected respiratory variables. The subjects of the study were 60 women post graduates studying in Pondicherry University. The subjects were randomly assigned to four groups that is one control group (N=15) and three experimental groups (N=15 each). Group-I practiced cycling, Group-II practiced pranayama and Group-III practiced combination of cycling and pranayama five days a week for a period of 12 weeks. The control group did not participate in any sort of physical activity (cycling and pranayama) during the same period. All the subjects were tested in the selected respiratory variables such as respiratory rate, tidal volume and vital capacity before and after 12 weeks of cycling and pranayama. Respiratory rate was noted by seeing the number of breath per minute. The tidal volume and vital capacity recorded in litter with a standard Spiro meter. The data pertaining to selected respiratory variables were analysed by ANOVA and it concluded that there is a significant change on respiratory rate, tidal volume and vital capacity after the 12 weeks of cycling and pranayama practices.

The main purpose, this preliminary study, was to analyze some important aspects of 'Padmasana' on the basis of biomechanical principles and to see if the results could be applied to teaching, preforming, and assessing 'Padmasana'. A stage-wise analysis was done considering the biomechanical dimensions viz., knee flexion time, inclination of spine, disc pressure on L3-vertebra, moment of force and moment of inertia at knee joint, and the line of gravity, on the basis of anatomical movements in Padmasana. Standard procedures and methods were used to measure these parameters (Bera & Rajapurkar 1989). The instructions based on biomechanical principles applied to Padmasana were found suitable in maintaining a comfortable posture. Therefore, like other sport skills, a teacher can apply the knowledge of biomechanics for a better teaching method in yoga which may facilitate better performance in a comfortable posture. The approach
of biomechanics depends upon the scientific facts which may bring uniformity in teaching, assessment, and practice of Padmasana and may lead towards the standardization of its technique.

Physiological functions were studied in 12 healthy and trained subjects before, during and after 10 minutes Kapalabhati (KB) on 8 channel polygraph (Gore, Gharote, Rajapurkar, 1989). Heart rate and Eye movements increased and finger pulse volume decreased significantly during KB. No significant change was found in EEG and Blood-pressure. An apneic condition was observed immediately after KB.

The purpose of this study conducted by Kennedy (1985) was to determine the effects of eccentric work and its comparative contribution in the development of power and strength. Three different strength training techniques were used and compared. Three groups of untrained subjects (males and females, n=33) were trained for 10 weeks using one of the three prescribed methods. Pre test and post test measures were taken for muscle girths, body fat percent, performance on Cybex at three different speeds of arm flexion and leg extension, and 1 RM strength tests using Nautilus machines. Results varied as to testing method used. When Nautilus was used as a testing modality, no significant differences by group were found. However, males showed a significant response to eccentric only training as compared to concentric only and concentric/eccentric. When a Cybex was used as a testing modality using three different speeds (30, 60 and 120 degree per second), the concentric only group performed significantly better than the eccentric only group or the concentric/eccentric group. For the females, no significant difference in response to training group were noted; however, the males performed significant better than the females in the concentric only group.

The purpose of this study conducted by Hailes (1987) was to determine the relationship between the dependent variable, perceived physical fitness, and the independent variables, knowledge of physical fitness, actual physical fitness, and health status within a college population and to examine the effects they had on each other to increase physical fitness. The psychological and cognitive variables analyzed were in the form of questionnaires: health, fitness, and nutrition knowledge test (Blackwell, 1985); perceived physical fitness questionnaire (Abadie, 1985), and health hazard appraisal (Hall, 1984). The actual physical fitness tests administered
were in the areas of cardio-respiratory endurance (1 mile run), low back/hamstring flexibility (sit and reach), muscular strength (handgrip dynamometer), muscular endurance (sit ups), and body composition (skinfold measurements). The subjects in this study are limited to college students (total=229, females=121, males= 108) enrolled in the concepts of physical fitness course during the fall semester of 85-86 at the university of southern Mississippi. The stat technique of stepwise multiple regression was used to test the hypothesis of this study. For a relationship to be significant, the alpha level 0.05 was required. The hypothesis was rejected (F= 28.26, degrees of freedom = 5/223, p<0.001). This study demonstrated the best single predictor of perceived physical fitness to be cardio-respiratory endurance, and body composition sig predicted perceived physical fitness, however, none were sufficient by themselves to be a strong predictor of perceived physical fitness.

Effect of 9 months yoga training programme, on measures of Attitude towards Yoga, Neuroticism and Value system, was studied in 25 healthy student volunteers from G.S. College of Yoga Lonavla (Bhogal, Oak & Bera 2002). 14 students from local degree college acted as controls. The statistically significant changes in scores on Attitude scale(p<0.05) and Neuroticism inventory (p<0.01) indicate respectively, a favorable change in students' attitude towards yoga and a marked reduction in their neurotic tendencies. Responses on a Value test, taken in the beginning, middle and at the end, revealed an enhanced "social value", followed by "religious" and "aesthetic" values, in the order of degree of enhancement.

Yogic practices have been reported to improve the health and fitness of an individual. The present study was undertaken by Ganguly, Gharote, & Jolly (1989) on 14 male students of R. P.T. S., Khandala with a view to see the immediate effect of Kapalbhati on cardio-vascular endurance as measured through Harvard Step Test. Significant improvement (p < 0.01) was seen in their cardio vascular endurance after performing one minute of Kapalbhati as compared to the hyperventilation.

Singh (2007) aimed to find out the impact of Nadisodhana Pranayama on forced vital capacity (FVC). The sample consists of 40 persons containing 20 males and 20 females (age range 20-40 years) drawn from Yug Shilpi participants of Dec. 2003 session in Shantikunj, by using Simple Random Sampling without Replacement. The
research design employed was one group pre-post-test design. Practice time was fixed 30 minutes for each morning and evening sessions per day and the intervention was given for 1 month. The result revealed that the practice of Nadisodhana Pranayama significantly improves the FVC, which implies the improvement of lung function.

The effects of longitudinal forearm rotation in 3 positions, those of supination, semi-pronation, and pronation, and angle of elbow extension from 70 degree through 180 degree at 10 degree intervals were examined with respect to mean maximal isometric elbow extension torque. Subjects for this study were 48 normal right hand dominant college age males who were tested at 35 experimental positions while seated and properly restrained (Triczynski, 1986). The right shoulder was flexed to 90 degree and the upper arm supported. Each individual received all 36 possible treatments in random order. Subjects were asked to produce max isometric exertions of the elbow extensors against the forearm immediately below the styloid process to remove possible contribution of the palmar flexors and extensors. The 36 trials each separated by a 30 min rest period to reduce fatigue. Subjects were also given 1 min rest periods between each individual trial for the same reason. Ascending descending torque by angular position curves were produced across all angles at each of the three longitudinally rotated forearm positions. Torques recorded rose steadily from 70 degree through 90 degree until a plateau of max force was recorded from 90 degree through 120 degree. After the 120 degree position forces steadily declined until the elbow was completely extended. The supinated forearm position was observed to be associated with the lowest mean max isometric elbow extension torque scores at all angular positions except that of 70 degree. Both the semi pronated and pronated longitudinally rotated forearm positions were associated with higher mean max isometric elbow extension torque scores than the supinated forearm position, but they were not different from each other. Therefore, it is conjectured that either the pronated or semi proanted forearm position should be assumed with any angle form 90 degree through 120 degree at the elbow when testing for max strength of the elbow extensors. One should also expect lower forces to be recorded if the subject is tested at angles outside of this range and/or with the forearm supinated.
Left and right knees of 20 male subjects (n=40) were evaluated for rotational and lateral stability (Goldfuss, 1980). These data were used to establish reliability of knee measurements, to determine whether measures of knee rotation were similar at knee positions of 90 degree and 120 degree, and to determine the relationship between lateral and rotational knee stability. Initial attempts were also made to establish validity of knee rotation evaluations by correlating them with angular displacements of a pin which was strapped around the subjects leg, just below the knee. Validity of knee rotation evaluations was assessed further using 19 fresh cadaver knees. The criterion measure of knee rotation was the angular displacement of a pin which was inserted into the tibial tuberosity. Knees of 25 adult male subjects were measured for knee rotation by 2 evaluators for the purpose of determining objectivity. The apparatus provided valid, reliable and objective measures of knee rotation and yielded evaluations which were similar at knee flexion positions of 90 degree and 120 degree. No relationship was found to exist between measures of lateral and rotational knee stability.

The study determined whether objective evaluation of a gross motor skill would be biased by introduction of positive, negative, and neutral experimentally induced performance expectancies (Hatfiels, 1981). Whether the stereotyped behavior characteristics associated with the performer’s somatotype (endomorph or mesomorph) would influence objective performance appraisal was also examined. 45 male physical education majors were randomly divided into 3 expectancy conditions in which they subjectively evaluated the stabilometer performance of an endomorphic and mesomorphic task performer. These expectancy conditions were created by the experimenter providing standardized pre-evaluative information regarding the performer’s errors. From these standardized performances and subjects subjective estimates. Algebraic difference scores were calculated and used for data analysis. The hypothesis that the positive expectancy performers would be attributed less error in relation to their actual scores compared to the negative and neutral expectancy performers was confirmed (p<0.05). The hypothesis that the mesomorphic performer would be attributed less error as compared to the endomorphic performer was not supported. A post experimental questionnaire serving as a manipulation check revealed that positive expectancy evaluators rated
the performers in much more positive terms (e.g., more intelligent and adjusted) than the negative expectancy group.

Indian culture stresses the importance of direction during performance of daily activities. Some yoga teachers prescribe that yogic relaxation and polarity practices must be done while lying with head towards north in order to align oneself with the earth's electromagnetic field. There is some evidence that earth's magnetic field influences physiological functions. Hence, the present study was undertaken to see whether head direction has any effect on heart rate (HR) and blood pressure during supine rest. 43 normal healthy school children were recruited and their recordings were taken after 5 minutes of supine rest. The subjects were randomly assigned to lie with their head towards north, east, south and west directions on four different days. HR and blood pressure were recorded at the end of 5 minutes of supine rest. HR was lowest in north and highest in south, the difference being statistically significant by Student's paired 't' test. Systolic pressure was lowest in the north and significantly higher in the west. Lying supine with head towards north had the lowest rate-pressure-product as compared to the west. Our study demonstrates that lying supine with head in different directions has a definite effect on the HR and blood pressure. Further studies in different age groups and in hypertensive patients may help in understanding the mechanisms and implications of this phenomenon.

40 male subjects at NCCU, 18-22 years old, and ranging in weight form 62.5 to 135 kg, were used to assess effects of ethyl alcohol on motor performance (Bond, 1990). The variables measured were visual tracking, balance, RT, and heart rate. The subjects, moderate drinkers, were randomly divided into 4 equal groups. Each group was administered either 0cc, .2cc, .4cc or .6 cc of ethyl alcohol per kg of body weight in the form of 190 proof Ever Clear Whiskey diluted with 10 oz of grapefruit juice. Each subject was given 3 30 sec trials on the pursuit rotor, stabilometer, and reaction timer. A continuous progressive 9 min task on the bicycle ergometer was used to examine exercise heart rate at 600, 900, and 1200 Kpms. The t test for paired differences was used to analyze the data. It was found that after ingestion of .2 cc of ethyl alcohol per kg body weight significant differences occurred in exercise heart rate at 900 and 1200 Kpms; after ingestion of .4 cc a significant difference resulted in
visual tracking performance; and after ingestion of .6 cc a significant difference occurred in resting heart rate and exercise heart rate at 900 Kpms.

The effects of an eight week walk/jog program upon the retention of upper and lower extremity strength was determined (Grantham, 1988). Twenty four middle aged male executives from Dallas, X with an average age of 29 years, a average height of 69 inches and a average weight of 187.6 lb represented the sample size. Following eight weeks of resistive training, all subjects were pretested for strength and endurance measures. The subjects then engaged in an eight week walk/jog program working between 70 and 80% of max heart rate. After the training period, all subjects were then re-tested on all strength and endurance measures. A 2 way ANOVA with repeated measures was used to test for average group differences between pre test and post test strength measures. A t test for dependent average was used to ascertain differences in cardiovascular measurements. Alphas were 0.05. Results indicated that muscular strength was retained during the eight week walk/jog program. No change in upper or lower extremity strength occurred, but significant improvements in VO2 and treadmill time were evidenced.

The purposes of this study were to determine if: grip strength had a significant relationship to throwing velocity, range of wrist flexion had a significant relationship to throwing velocity; length of the throwing arm had a significant relationship to throwing velocity; and if there was a predictive value to any of the 3 resulting relationships (Richardson, 1988). Subjects were 31 varsity high school baseball players, currently in regular season play. Grip strength was measured with a dynamometer, wrist flexion with a goniometer, segmental lengths with anthropometric tapes and throwing velocity with a hand held radar unit. Data obtained were then analyzed by a multiple linear regression and a stepwise multiple linear regression. Conclusions were: grip strength had a significantly positive relationship to baseball throwing velocity, wrist flexion had no significant relationship to throwing velocity; length of the arm had no significant relationship to throwing velocity; and throwing velocity can be moderately predicted (36% shared variance) from grip strength measurement.

Male and female 5th and 6th grade subjects were compared under 4 conditions comprising the presence or absence of informational and/or motivational cues using the Bachman free standing ladder balance task (Feltz, 1985). From 80 subjects
employed, 10 males and 10 females were randomly assigned to each treatment in a subjects sex x motivational cues x informational cues (2 x 2 x 2) factorial design. In the informational motivational cues conditions, a model demonstrated (imparted task information) and also gave verbal KR of the model’s performance on the ladder as a motivational incentive. In the motivational cue only condition, no demonstration was provided by the model; instead, the model merely told the subjects how high he/she climbed on the ladder. In the informational cue only condition, a model demonstrated but gave no verbal KR. In addition, these 3 groups were compared to a no cue condition, where the subjects received no demonstration or verbal KR. Prior to the experiment; subjects were given the children’s dependency scale to check for the effect of dependency on imitation. Analysis of the dependency scores indicated that females had significantly higher dependency scores than males. Analysis of the 30 performance trials indicated that males had higher average performance scores than females on the performance trials and that subjects receiving a model demonstration had higher performance scores than subjects not given a model demonstration. Motivational cues provided by knowledge of the demonstrator’s performance did not appear to affect performance on the Bachman ladder.

Blood pressure (BP) and Pulse Rate (PR) were studied before and immediately after 10 rounds of Anulom Vilom pranayama in four different conditions on eight male volunteers who were beginners or fresh students of yoga (Gore, 2004). Four conditions were: (1) without kumbhaka as well as time ratio; (2) without kumbhaka but with time ratio of 1:2:2; (3) with kumbhaka and time ratio 1:2:2 and (4) with kumbliaka, three bandhas and time ratio of 1:2:2. Results showed that in condition No.1 there was insignificant reduction in BP and increase in PR. In condition No.2 also, an increase in systolic BP by 8.7 mmHg was nonsignificant (p>0.05), where in condition No.3 an increase in SBP by 5.3 mmHg was significant (p<0.05) and in condition No.4 BP increased but not significantly (p<0.10) by 6.8 mmHg. Marginal increase in PR by 3 beats/min was nonsignificant. The increase in BP due to practice of kumbhaka, bandhas and specific time ratio was found within the normal range and therefore the traditional technique of Anulom Vilom pranayama (condition No.3 and 4) are 'physiologically safe' even for the beginners.

Declined health and fitness status of school children has become a challenging problem of research. Many recent investigations indicate increasing trend of severity
in health problems that affect overall work capacity of school children. In this study, by Govindrajulu et al., (2002) status of work capacity of elite school players (n=75), age ranged 13-17 years, from some of the schools of Pondicherry (India), was evaluated. Work capacity of 13 years, 15 years and 17 years boys has been compared. Result of ANOVA and follow-up statistics revealed that work capacity varies as age increases. Regular participation in different exercise-regimes although helped to improve work capacity, however, the players habitually participating in yogic exercises along with exercise-regimes could show higher work capacity. The study suggests benefit in inclusion of yoga in the exercise regimes for exhibiting better performance in school sports.

Sixty high school boys, age ranges from 14 to 16 years, volunteered in this study. The sample consists of athletes (n1=20), non-athletes (n2=20) and controls (n3=20) (Govindrajulu, 2003). Both the athletes and non-athletes were subjected to eight weeks training of yogic practices along with participation in daily school programme. The control group did not participate in the said yoga training. However, participated in daily routine programme in the school. Prior to and after the training programme the subjects were assessed for blood pressure, vital capacity and cardiorespiratory efficiency. The data collected from all the three groups were statistically analysed by ANOVA. The results revealed significant mean differences in the criterion variables were higher in athletic group as compared to non-athletic and control groups.

The concept of health in yoga is very wide and is stated in terms of the absence of factors that disturb the mind (Gharote, 1990). It is an ideal state of balance or harmony. In order to develop such a state of balance various integrated techniques are employed in Yoga. Patanjali’s word for physical perfection is ‘Kayasampat’. His theory states that any degree of perfection can be achieved for the body if the five ‘Bhutas’ of which the body is composed of are concentrated upon. Patanjali suggests that mind trained to concentrate on subtlest entities is the one instrument with which all diseases could be conquered and a state of ideal health is attained. Preventive aspect of health suggests protection from possibilities of recurrent conditions of ill-health. Promotive aspect emphasizes upon the development of conditions leading to increased efficiency and comfort. We need to be protected from the imbalances created within ourselves due to lack of adjustment with the environment and result of the way we live. Yoga
shows a way through the integrated practices not only how to protect but also to fortify ourselves. The channels through which the results are brought about and mechanisms involved are stretch reflexes, control of autonomic responses and modification of higher nervous controls.

The research reports presented above indicate that there is no direct evidence available so far on the influence of breathing exercises and pranayama practices in relation to discus throwing performance. However, supportive studies suggest that the practice of pranayama may help to improve physical fitness as well as pulmonary functions and breath-holding time that may be of importance in many of the track-field events. Since there are no studies conducted so far, to evaluate the effect of breathing exercises and pranayama on discus throwers’ performance, the present investigation planned seems to be justified.