CHAPTER - II

REVIEW OF RELATED LITERATURE

The literature in any field forms the foundation upon which all the future works will be built.

A study of relevant literature is an essential step to get a full picture of what has been with regard to the problem under study. Such a review brings new ideas, theories, and comparative materials and helps the development of research procedures.

The study of related literature brings information on the related studies of relevant researchers. The researcher has tried to collect the information related to the present study. The researcher has gathered the related studies from books, journals, research quarterlies, magazines, and articles to add for the dimension and the scope of this study. In this chapter related literatures with respect to health related fitness exercises and therapeutic massage are included. Within this understanding, the review of related literature is presented as depicted below.

Campbell (1962) conducted a study on effect of weight training in motor fitness of college football, basketball, and track and field squads during their competitive seasons. To measure motor fitness the composite “t”scores for the following seven were used .Right grip, jump and reach, squat thrusts, pull ups, sit ups, 300 yard shuttle run and 50 yards dash. Each sport was divided in to two groups, watched by motor fitness composites, at the beginning of the respective seasons known as A and B groups for each sport. From the opening day of the season until mid season. A group took regular training for its sport and also followed twice a week, a progressive weight training program designed for the respective sports. The B group took regular training for the sport only. At mid season ,the A group dropped and the B group added weight training .In all instances motor fitness improved significantly beyond the regular sports training as a result of strength conditioning with weights.
When weight training was dropped, motor fitness declined. The investigator concluded that weight training should be started well before the competitive season and continued throughout the season. The study did not investigate improvements in playing the various sports as a consequence of strength development through supplemental weight training activity.

Banister (1965) in his study selected four groups of 14 to 16 years old boys in a North Vancouver Junior high school were closely matched on the basis of their sores on three indices. In one out of their four weekly physical education periods they took different training programs (1) Interval, circuit training, emphasizing endurance and strength training (2) conventional circuit training with endurance running (3) Conventional circuit training with games activity (4) Playing games only. The effect of introducing these different programs in a typical weekly school was studied. Gains were made by all groups in all the indices 2 months later. The largest gains were by the interval circuit training group particularly in the strength index.

Boileau et.al (1973) in their study selected the subjects ages 23-24 years were randomly formed into weight training (N=7) jogging (N=7), and control group (N=7). Body composition was assessed by duplicate pre-and post-training measures if body potassium, 11 skin fold thickness sites and 4 body girth sites. The physical training programs were conducted for 13 weeks, 3 days per week, 30 minutes per session. Significant increments in fat-free weight assessed by 40 K whole body counting and in chest and upper arm girths were found in the weight training group relative to decrements in these measurers observed in the jogging and control groups. Body fat determines in all these groups from 40 K and skin fold thickness measurements did not significantly change, with the exception of a statistically significantly decrement in the cheek skin fold measurement of the jogging group.

Wilmore (1974) conducted a study of alternations in strength, body composition, and anthropometric measurements consequent to a 10 week weight training program. Forty seven women and twenty six men volunteered to participate in a 10 week program of intensive weight training, with an average attendance of two days per week, 40 minutes per session. Assessemments of strength, body composition and anthropometric
girths, diameters and skin folds were made at the beginning and at the conclusion of the study period. Both groups made similar relative gains in strength and absolute gains in body composition. The men were stronger than the women for all strength measures, although the women exhibited greater leg strength when expressed relative to lean body weight. Muscular hypertrophy evident in both groups, was confined basically to the upper extremity, and was substantially greater magnitude in the males. Correlations between absolute strength and girth size indicate a probable relationship between muscle size and strength. But hypertrophy is not a predominant consequence of increasing total body or individual muscle strength.

J. Sunnegardh, L. E. Bratteby and S. Sjolin (1985) conducted a study on the physical activity of randomly selected 8 and 13 years old children, living in four different regions of Sweden, were investigated by means of a questionnaire.

The younger children of each sex found to be physically more active than the girls. The result points to higher sports involvement today compared with 10-15 years ago, especially among younger children. It was also shown that regular physical training constituted a smaller proportion of the total physical activity among the younger children than among the older ones. At both ages and in both sexes the rate of regular physical training was lower in municipalities of less than 1000 inhabitants, and in the 8 year old children it was also lower in municipalities of less than 5000 inhabitants. Among the girls regular physical training was more common in those whose fathers had a high educational level compared with the girls who had fathers of a lower educational level.

Haskell, et al (1985) investigated the physical activity and exercise to achieve health related physical fitness components. To improve health and fitness effectively through physical activity or exercise, we need to understand how this comes about.

For many of the changes, the stimulus has been grossly defined in terms of type, intensity, duration, and frequency of exercise, but for others a dose-response relationship has not been determined. Physical activity that appears to provide the most diverse health benefits consists of dynamic, rhythmical
contractions of large muscles that transport the body over distance or against gravity at a moderate intensity relative to capacity for extended periods of time during which 200 to 400 kilocalories (or four kilocalories per kilogram of body weight) are expended. For optimal health benefits such activity should be performed daily or at least every other day and should be supplemented with some heavy resistance and flexibility exercises.

The greatest benefits are achieved when the least active individuals become moderately active much less benefit is apparent when the already active individual becomes extremely active. Overexertion or in appropriate exercise can produce significant health risks. Research is needed to characterize better the health promoting features of physical activity and exercise.

Russell R.Pate (1985) conducted study to determined physical fitness of college age young adults. Data for this normative study were collected under the supervision of co investigators who were affiliated with institutions distributed in all regions of the United States. The study presents the derivation of the college age norms including data collection, methodology and analysis.

Brown (1986) conducted a study to determine the effects of a strength training program on strength, body composition and self concept in young and matured women. Forty three subjects completed 12 weeks of weight training while 42 acted as controls. The mature experimental (ME) and young experimental (YE) groups showed significant (P<0.05) increase in strength as compared to the control group. The ME group gained strength at the same rate as the YE group. No changes in body composition were observed. The experimental groups showed significant (P<0.05) improvements on the self concept scales compared to control group. These results support the inclusion of strength training fitness program for healthy mature women.

Siedentop, et al (1986) state that health related fitness is of major importance to the well-being of society and necessary element in physical education programs. Health related physical fitness is concerned with the development of these qualities that offer protection against disease and frequently are associated with physical activity. For example, certain physiological factors
often affected by physical activity which cause some degenerative diseases, such as obesity and coronary heart disease. Thus health-related physical fitness is important to everyone and should be stressed by physical education.

Meyer, Nancy Lynn (1987) conducted a study to investigate the effects of ten weeks of strength and flexibility training on the strength, flexibility, body circumference and self perception. Thirty one untrained women were selected and trained three times a week for ten weeks for strength and flexibility using Nautilus machines and static stretching. Significant difference was found for the total group between pre-test and post-test. The younger group had a better body score. No significant differences were found between groups in pre-test means. No significant differences were found in post-test means except in flexibility.

The American Academy of Pediatrics Committees on Sports Medicine and school health (1987), and the American College of Sports Medicine (1988) have issued strongly worded statements highlighting the need for school physical education programs to adopt health-related physical activity goals.

In a society in which adult sedentary behavior contributes substantially to the epidemic of cardiovascular and other chronic diseases, there shifting the orientation of physical education to a health focus, moreover, school physical education is the only major institution that can address the health-related physical activity needs of virtually citizens.

Knuttgen compared the physical fitness of Danish school children with that of the American school children by administration of AAHPER youth fitness Test. The results of this investigation showed that the performance of Danish children was better except in softball throw.

Maker made a selection of seventy four boys 12 to 18 years from the public schools in Edmonton and Alberta. He conducted the AAPHER youth physical fitness test, non-language multi-mental test and Stanford achievement test.

The correlation between physical fitness and intelligence was positive, but it was in significant and the comparison of physical fitness with academic achievement was positive and significant.
Kraw and Hirschland used six items of test battery and made a comparative study of Europeans and American children and showed that the American children’s fitness level is below as compared with their European counterparts.

Basing on this report, American president adopted some positive steps to improve the fitness of the American children.

The Oregon simplification of the strength and physical fitness indices are presented in an effort to secure more strength testing of this report in the public schools. Obviously the simplified version do not require as many pieces of testing apparatus as does the full test, although a back and leg dynamometer is still necessary also, the simplifications can be given more rapidly and with fewer testers than the complete test. Testing skill is a requisite for the dynamometer tests.

Wiler conducted an experiment on longitudinal comparisons of maturity, physique structural strength and motor characteristics of 12 years old elementary school athletes and non participants, change in maturity, physique, structure strength and motor traits during the period from 9th to 12th year of age were examined in elementary school boys, who were successful interschool athletes. The best differentiates of athletic ability in sequential order were standing board jumper’s arm strength scores 60 yards shuttle run and physical index test. The three somato type components, various structural measured and pull-ups had little apparent value as differentiates of athletic ability in these ages.

Khurt took a study of co-physical development of athletes “In general participation in athletics “seemed to be related to certain physical development not found in non-participation. Regular attendance in physical education classes is not related to changes in certain physical development as participation in athletics. The presence of variables such as height, weight, age, hereditary and previous opportunities for physical development .therefore, no final conclusion concerning the influences of these variables are ventured until more extensive experiment is conducted.

Research studies by Peter V.Karpevich, 23 among the aircrew personal indicate “that enlisted aircrew personal entered the Army Air Force in fairly
poor condition. The men were found to be lacking in running speed and endurance or the abdominal muscles, but were more deficient in arm and shoulder strength. The mean score of entering personal were 34.5 sit-ups, pull-ups 56.3 seconds in the shuttle run and 44.5 for the physical fitness rating.

At all age levels and for all test items entering personal scored lower than men who averaged 21.5 weeks of training in the AAF (AAF physical fitness test). The AAF physical fitness test consists of three test items which are push- ups, sit- ups and 300yards shuttle run. The physical fitness rating (PFR) calculated from the scores of the three tests are used as an index of fitness.

Leary made a comparison of the physical level of seventh grade boys before and after a planned physical education program. The testing devise was the AAHPER youth fitness test, measuring arm and shoulder, girdle strength, abdominal strength, speed, agility, flexibility, coordination and cardiovascular efficiency. Comparison of the initial and the final scores of the 70 students revealed and improvement in each test and each component of physical fitness. It is recommended that more emphasis be given in schools to plan program of physical education or for desirable physical development.

Ghanima (1987) conducted a study to investigate the effects of a six week exercise and rope jump program on AAHPERD health related physical fitness scores of high school females.

Sixty two students were divided into two groups. One group participated in a designed exercise and rope jump program which consists of warm up, conditioning exercise, rope jump and cool down period. The other group of students participated in one or more sports activities. All subjects participated in18 sessions three times each week for 30 minutes in a six week period. Pre and post-test scores were recorded significantly better in all four components than subjects who participated in the regular physical education classes. Subjects who participated in the regular physical education class did not score significantly higher in any of the four components.
Clare Maxwellhudson (1988) said “Early morning stroking with the palm of the hand, after the night’s sleep, when the blood is rested and the tempers relaxed, protects against colds, keeps the organs supple and prevents against colds, keeps the organs supple and prevents minor ailments.

Massage has always been greatly valued in India, and practically everyone knows how to massage. Mothers massage their babies, and later these children are taught to do the same for their parents. Massage is incorporated in Ayurvedic treatments, an Indian system of medicine dating back to 1800 BC, with herbs, spices and aromatic oils being rubbed into the skin.

Throughout history we have used our hand to impart comfort and healing to one another. Touching is contact, warmth, reassurance that we are not alone, and affirmation of our sense of being and self-worth. It is a simple way of communicating, something we all do naturally. And with a little willingness and commitment we can turn this natural talent into a creative healing skill, by learning the basic strokes and techniques of massage and widening our vocabulary in the language of touch.

H.K. Bakhru (1991) explained about the aim of massage is to exercise the muscles, without straining the heart, which dystrophy or rust when they are not used or exercised. Without straining the heart in weak patient’s whole musculature is exercised by touch, percussion, friction, kneading, and vibrations, rolling stroking and mixed movements.

Massage probably goes as far back in history as the existence of man. It is something that we all do instinctively: apes grooming each other, animals licking their wounds and men rubbing an aching joint are all using massage. It is probably the oldest form of medical treatments. It was called antripsis by the Greek physician, Hippocrates, and referred to as tripsis, friction, manipulation, rubbing or shampooing by other writers. Our use of the word massage is relatively new, and probably derives from the Arabic word “mash” which means to stroke with the hand. The earliest mention of massage appears in a Chinese book dating from about 2700 BC.
N.B. Shukla, et al (1991) conducted a study on motor fitness test on rural and urban Indian sportsmen. 120 sportsmen (60 urban and 60 rural) were included in the present study. They hailed from the states of Uttar Pradesh and Punjab. They participated in games like hockey, handball, cricket, kho-kho, athletics, and volley ball. Urban girls participated in minim national state and national games, while rural girls participated in inter-collegiate rural tournament, state and nation for comparisons they were divided into three groups A (13 to 16 years), B (17-19 years) and C (above 19 years). Height and weight recorded. AAHPER tests were employed which consisted of the following:

Softball Throw (SBT), Sit up (SU), Push up (PU), Shuttle Run (SR), 50 yards dash (50Y), standing broad jump (SBJ), and 600 yards dash (600Y). The result revealed that in SBT the sportswomen had very poor result indicating very low explosive capacity of the upper limb muscle. Further, the rural sports women were poor in shuttle run indicating minimum agility in them. The rural girls of A and B group were observed to possess poor anaerobic muscle power as had been revealed by 50 yards dash run. The overall performance of the urban sports women was higher than the rural counterpart. On further analysis it has been observed C group of urban sportswomen were comparatively superior in 50 Y, SBT, SR, SU, than those of lower age groups. Further in Uttar Pradesh both rural and urban sportswomen were very efficient. The overall superiority of urban sportsmen than their rural counterpart might be attributed to better coaching and other facilities.

Adams, et al (1992) investigated the effect of six weeks of squat, polymeric and squat-polymeric training on power production. Explosive leg power is a key ingredient to maximizing vertical jump performance. In training, the athlete must use the most effective program to optimize leg power development. The purpose of this study to compare the effectiveness of three training programs, such as Squat (S), Polymeric (P), and Squat-Polymeric (SP) in increasing hip and thigh power production as measured by vertical jump. Forty eight subjects were divided equally in to four groups: S, P, SP or control (C). The subjects trained two days a week for a total of seven weeks, which consisted of one week technique learning period followed by a six week periodized S, P, or SP training program. Hip and thigh power were tested before and after training.
using the vertical jump test, and the alpha level was set at 0.05. Statistical analysis of the data revealed a significant increase in hip and thigh power production, as measured by vertical jump, within all three treatment groups. The SP group achieved a statistically greater improvement (p < 0.0001) than the S or P groups alone. Examination of the mean scores show that the S group increased 3.30 centimeters in vertical jump, the P group increased 3.81 centimeters and the SP group increased 10.67 centimeters. The results indicate that both S and P training are necessary for improving hip and thigh power production as measured by vertical jumping ability.

Bowers, et al (1992) conducted a study to explore the relationships of certain characteristics of the hand and forearm to hand grip strength as measured by adjustable and nonadjustable types of dynamometers. It was found that the measurements of the length of the hand and fingers and forearm girths were significantly related to hand grip strength. First order partial correlations, with weight held constant, changed the significance of only one of the relationship; the correlations between hand length and grip strength scores registered on the Narragansett hand spring dynamometer. A comparison of the means of the scores obtained on each of the three dynamometers, the steeling adjustable dynamometer, the cable densitometer, and Narragansett hand spring dynamometer, showed a significant difference only between the cable densitometer and the Narragansett hand spring dynamometer. The objective of the present study is to design a specific pre-season training package which will develop the performance factors of fast bowlers in cricket. The study is intended to find out the effect of the training package on selected physical fitness variables, (speed, grip strength, agility, flexibility, endurance, leg explosive power, shoulder explosive power, percent body fat and lean body weight) and skill performance variables such as (bowling speed, bowling accuracy and bowling ability) of league level fast bowlers and to observe their periodical improvement. The investigator has made an attempt to bring a brief review of research related to the present study to form the background for the present study.

Yadvindar Singh (1992) explained how Philosophers consider the meaning of life, the universe, the words we use, but only if such things are incapable of
proof. A philosopher can never be really wrong, which makes philosophy quite an attractive occupation. Each sportsman will have his own philosophy, but if he is a member of a family, team, a society, then he is inextricably linked with the philosophical state of the large group. His attitudes towards sport are part of society’s attitudes, and his overall success will depend to a certain extent upon his consideration and understanding of the widely held philosophical viewpoint.

Henriksson and Hickner (1993) opined that skeletal muscle undergoes major adaptation in response to endurance training. It seems quite likely that an increase in mitochondrial density is the most important factor in presenting metabolic homeostasis in the muscle cell during exercise. The resultant increased ATP or ADP+P, ratio during exercise in training muscle would inhibit phosphor fructose kinase and result in less stimulation of glycogen depletion and lactate production. In addition, the increased fat oxidation in trained skeletal muscle plays a major role in the sparing of muscle glycogen. The above-mentioned adaptations are accompanied by the increased of trained skeletal muscle and, after several years of endurance training is fiber type transformations from fast-twitch or slow-twitch. The increased insulin action in endurance training demonstrates the importance of consistent exercise in insulin action is to be improved in pathological states such as obesity or if exercise is to protect against the development of insulin resistance with again. Many of the above mentioned adaptations are well described, while others have yet to be fully elucidated.

Chatterjee, et al (1993) conducted a study of physical and motor fitness levels of Indian school going boys. A cross-sectional study of physical and motor fitness measurements were undertaken on 629 healthy Indian (Bangalore) school going boys of 9-18 years. The study brought to light gradual increase in physical and motor fitness measurements with the advancement of age except physical fitness score.

Major increments were recorded between 13 and 15 years of age. All the fitness test scores showed significant positive correlations with age, height and weight. But Dash, Shuttle run, and PFI showed significantly negative relationship. Indian boys of the present study were superior in sit and reach
and inferior in vertical jump to Belgian boys of comparable ages. These boys showed higher values in vertical jump than American boys after the age of thirteen. Dash and shuttle run test scores of Indian boys fall between 15th to 25th and 30th to 45th percentiles of American standard respectively. Besides, American boys and superior in Grip strength to Indian boys.

Percentile values of physical and motor fitness test scores of Indian boys are therefore, useful for determining their present fitness status and potentiality in that particular community for specific sports activity.

In this way, certain comparisons may be made and thereby certain conclusions may be drawn. From such conclusions several recommendations may be made to see that there are proper developments in school children. Physical education programs if done so in scientific lines in schools might bring desirable changes in skill related physical fitness of children. But, these physical education activities alone may not contribute to such an extent when coupled with the active lifestyles.

Jacobs (1993) conducted a study on strength training in which, novices to strength training the rapid increases in strength that occur during the first 2-4 weeks of training can be largely attributed to neural factors, i.e. to “Learning” to maximally recruit and exploit the motor units available in the musculature. This conclusion is based on the repeated observation that the maximum integrated electromyography activity of the trained musculature increases significantly without any measurable hypertrophy of the muscles. Hypertrophy of individual muscle; fibers are detectable in biopsy samples after about 8 weeks of training.

Finkenberg ME and Dinucci JM (1995) studied the health-related physical fitness status of boys and girls in grades 5 and 6 in a rural school district in East Texas in an examination of possible age ethnic, and gender differences. A three-way multivariate analysis of variance was conducted with gender, ethnicity, and age as the independent variables and nine physical measurements as the dependent variables. Height was the most important discriminating physical measurement, with girls significantly taller than boys at ages 10 and 11 and with boys significantly taller than girls at age 13. Canonical
discriminate function separated black children from both Caucasian and Hispanic children in height, weight, mile run, systolic blood pressure and diastolic blood pressure.

Significant number of studies concentrated on the issue of physical work capacity, physical fitness components basing on the difference on racial, ethnic and regional differences or variations. Different studies showed different results, but the people living in rural areas showed significantly better physical standards when compared to the counterparts in urban areas in the regions.

Tsutsumi, et al (1997) conducted a study on physical fitness and psychological benefits of strength training in community Dwelling Older Adults.

Previous studies concerning psychological benefits exercise among the elderly has focused predominantly on the effects of aerobic exercise. In the present study, psychological and behavioral adaptations in response to 12 weeks of strength training were examined in medically healthy but sedentary 42 older adults (mean age of 68 years). The purpose of this study was to evaluate the effects of high and low intensity resistance training intensity on a muscular fitness, psychological affect and neuron cognitive functioning. Subjects were randomly assigned to high intensity/low volume (EXH: 2 sets of 8 to 10 repetitions for 75 to 85% of 1RM), low intensity/high volume (EXL: 2 sets of 14 to 16 repetitions for 55 to 65% of 1RM), or no exercise for control programs. Prior to and followed the 12 week program, subjects underwent comprehensive physiological and psychological evaluations. Physiological assessments included measurements of blood pressure, heart rate arm and leg muscles strength, body compositions and oxygen consumption (VO2max).

Psychological measures included evaluations of mood, anxiety, and physical self-efficacy as well as cognitive functioning. The results of this study indicated that both high and low intensity strength programs were associated with marked improvements in physiological fitness and psychological functioning. Specifically, subjects in the strength training programs increased overall muscles by 38.6 % and reduced percent body fat by 3.0%. Favorable psychological changes in the strength-trained subjects included
improvements in positive and negative mood, trait, anxiety, and perceived confidence for physical capability. The treatment effects of neuron cognitive functioning were not significant. In summary, this study demonstrated that participation in 12 weeks of high or low intensity strength training can improve overall physical fitness, mood, and physical self-efficacy in older adults while cognitive functioning remains constant.

Eric Benefice (1998) stated in his study that relationship among estimated body composition, habitual physical activity, and physical fitness were considered in Senegalese children 8.5-13.5 years of age. Anthropometric dimensions (arm and calf circumferences, trunk, and extremity skin folds, body mass index), four motor performances (dash, standing long jump, throw, grip strength), a step-test (cardio respiratory fitness), and heart rate (HR) monitoring (physical activity) were collected in 140 children (66 boys and 74 girls). Age and sex had a major effect on indication of body composition and physical fitness. Height stunting used as an indicator of chronic under nutrition had a remarkable effect on body composition but only a limited influence on physical fitness. Physical activity, represented by percentage of time above the flex-HR (% HR), did not vary with sex, age, and nutritional status.

However, there was a low to moderate correlation between %fHR and several body composition indices, grip strength and cardio respiratory fitness.

Comparison of children in the upper and lower quartiles of %f HR indicated that better indices of body composition in boys, and better strength and cardio respiratory fitness in girls were positively associated with a higher level of physical activity.

Bettiol H, et al (1999) conducted a study as there is little information on cardio-respiratory fitness of children, especially in ethnic minority in Britain. In this study we assess the associations of social factors, ethnicity, parental health related factors, child’s anthropometry, and blood pressure and cholesterol measurements with cardio-respiratory fitness. METHODS: Power output against load at 85% of the maximum heart rate (PWC 85%) was measured, using a cycle-ergo meter test, in children aged 8-9 years in 22 randomly selected areas in England, 14 in Scotland and in 20 inner city areas in
England. The subjects were 317 boys and 310 girls from the English sample, 152 boys and 140 girls from the Scottish sample and 242 boys and 261 girls from the inner city sample. RESULTS: Short stature (P < 0.001), fatness (P < 0.001), and Indian subcontinent origin (OR = 0.34, 95% CI: 0.16, 0.68 in boys and OR = 0.22, 95%CI: 0.12, 0.14 in girls) were associated with inability to finish the test. In those who finished the test PWC85%was greater in taller children and in those with lower skin fold values (p < 0.001, except height in boys (P = 0.017). The PWC85% in those originating in the Indian continent was lower (-0.17) watt/kg, 95%C: - 0.32, -0.01 in boys and - 0.29, 95%C: - 0.43, - 0.14 in girls) than in white children. CONCLUSION: shorter and obese children have poorer physical fitness than other children Physical fitness is lower in children originating in Indian subcontinent than other British children. This seems to be unrelated to socioeconomic disadvantage. Physical inactivity and lack of cycling skills may explain our findings.

J.M. Jussala (1999) explained: “Man’s original medical tool is his hand, which he has always instinctively used in order to alleviate pain. Whenever he is struck, stung, or seized with cramps, he involuntarily puts his hand to the painful spot in order to protect it or to rub, knead or massage it. Massage is the methodical manipulation of the surfaces of the body by the hand of the operator. It is often combined with `passive` and `active` movements.

Barik and Banerjee (2000) investigated the effects of specific conditioning program on selected performance variables among tribal students. By random sampling 17 tribal schoolboys of 14-16 years of age were selected from a residential school of West Bengal. All the subjects underwent a 6 weeks conditioning program specially designed for developing speed, endurance, strength and other fitness components. Standard tests were conducted before the 6 weeks training program and after its completion. From the findings the following conclusions were drawn. Speed, endurance, strength and agility were increased significantly after training. Insignificant changes in blood sugar level took place after training. Hemoglobin concentration, systolic and diastolic pressure decreased significantly after training.
Faigenbaum (2000) conducted a study on strength training for children and adolescents. The potential benefits of youth strength training extend beyond an increase in muscular strength and may include favorable changes in selected health and fitness related measures. If appropriate training guidelines are followed, regular participation in youth strength training program has the potential to increase bone mineral density, improve motor performance skill, enhance sports performance, and better prepare the youth athletes for the demands of practice and competition.

Despite earlier concerns regarding the safety and efficacy of youth strength training, current public health objectives now aim to increase the number of boys and girls age 6 and older who regularly participate in physical activities that enhance and maintain muscular fitness. Parents, teachers, coaches and healthcare providers should realize that youth strength training is a specialized method of conditioning that can offer enormous benefits but at the same time can result in serious injury if established guidelines are not followed. With qualified instruction, competent supervision, and an appropriate progression of the volume and intensity of training, children and adolescents can not only learn advanced strength training exercises but can feel good about their performances and have fun. Additional clinical trials involving children and adolescents are needed to further explore the acute and chronic effects of strength training on a variety of anatomical, physiological, and psychological parameters.

Pramanik. T and Pramanik. S (2000) conducted a study on physical fitness status among the students of Medical College in Kathmandu; Nepal. The physical fitness of Nepalese students at a medical college in Kathmandu was measured. The proportion of students with poor fitness, average fitness, good fitness, very good fitness and excellent fitness were 10.4%, 23.6%, 39.6%, 17.9% and 8.5% respectively. No significant difference between the male and female students in physical fitness index score was noticed in any of the fitness level groups.

Delecluse (2001) in his study analyzed the effect of high-resistance (HR) and high velocity (HV) training on the different phrases of 100 m sprint performance. Two training groups HR and HV were compared with two
control groups. The HR (N=22) and HV group (N=21) trained 3 days/week for 9 weeks; two strength training sessions (HR or HV) and one running session. There was a control group (N=22) that also participated in running sessions (1 day/week) and a passive control group (N=11). Running speed over a 100 m sprint was recorded every 2 m. By means of a principal component analysis on all speed variables, three phases were distinguished. Initial acceleration (0-10 m), building up running speed to a maximum (10-30 m) and maintaining maximum speed in the second part of the run (36-100 m). HV training resulted in improved initial acceleration, a higher maximum speed and decreased speed endurance. The HV group improved significantly in total 100 m time. The HR program resulted in an improved initial acceleration phase.

Han C.G. Kemper, et al (2001) said that in the American Growth and Health Longitudinal Study (AGAHLS), cohorts of about four hundred boys and girl with mean age of thirteen years were followed over a period of twenty years. Over that period repeated measurements were done of body dimensions (height, weight and skin folds), physical fitness (eight motor performance field tests; plate tapping, bent arm hang, 10 x 5 meters sprint, arm pull, sit and reach, standing high jump, ten leg lifts, 12 minutes endurance run and the one laboratory test to measure maximal aerobic power), and physical activity. Three research questions were studied: 1. Is there any relationship between adolescent and adult physical activity? 2. Do physical fitness and physical activity track from adolescence into adulthood? What is longitudinal relationship between physical fitness and physical activity? The conclusions were; 1. Physical fitness in adolescence is only weakly related to adult physical activity. 2. Between age thirteen and thirty three years physical activity has low stability and physical fitness has higher stability, and 3. the longitudinal relationship between physical fitness and physical activity are only meaningful with maximal aerobic power.

Lemmer, et al (2001) conducted a study on effect of strength training on resting metabolic rate and physical activity age and gender comparisons. The purpose of this study was to compare age and gender effects of strength training (ST) on resting metabolic rate (RMR), energy expenditure of physical
activity (EEPA), and body composition. RMR and EEPA were measured before and after 24 weeks of ST in 10 young men (20-30 years), 9 young men (20-30 years), 11 older men (65 - 75 years) and 10 older women (65 - 75 years). When all subjects were pooled together, absolute RMR significantly increased by 7% (5928+1225 vs 6328+1336 kJ.d-1, p <0.001). Further more ST increased absolute RMR by 7% in both young (6302+1418 vs 6719+1617 kJ.d-1, P < 0.01) and older (5614 +916 vs 5999+973kJ.d-1, p < 0.05) subjects with no significant interaction between the two ages groups. In contrast, there was a significant gender + time interaction (P < 0.05) for absolute RMR with men increasing RMR by 9% (6645+1073 vs 7237 +1150 kJ.d-1, P < 0.001), whereas women showed no significant increase (5170+884 vs 5366 + 692kj.d-1, P =0.108).

When RMR was adjusted for fat free mass (FFM) using ANCOVA, with all subjects pooled together, there was still a significant increase in RMR with ST. Additionally, there was still a gender effect (P < 0.05) and no significant age effect (P =NS), with only the men still showing a significant elevation in RMR. Moreover, EEPA and TEE estimated with a Tritrac accelerometer and TEE estimated by the Stanford seven-day Physical Activity Recall Questionnaire did not change in response to ST for any group.

Maciej Henneberg, et al (2001) studied the influence of sex, age and socioeconomic conditions on specific grip strength of 6-18 years old individuals was studied among 1,704 males and 1,956 females belonging to the so-called “Cape Coloured” community in the western part of South Africa. Half of the participants of both sexes came from communities in the Greater Cape Town area where living conditions are comparable to those middle class First World communities (high SES). The other half came from the poorest rural communities of Klein Karoo (low SES).

Arm circumferences, triceps skin fold thickness, and grip strength of the right and of the left hands were greatest in individuals from high SES at all ages. Females within each SES group had skin folds thicker than males, especially at older ages, and were weaker. Specific grip strength (SS), estimated as grip strength per unit area of cross section of the fat-free arm, increased with age in each group, was greater in males, and was significantly lower in low SES.
groups, than in the high SES ones, especially during and after puberty. It seems that SES difference in SS will persist into adulthood. Sexual differences in SS can be attributed to hormonal differences; while the SS increase with age and the difference between SES groups find no clear explanation in current theories of muscle growth and development. Since the speed of neuromuscular reaction observed in our participants is slower among low SES individuals, it seems that the difference in neuromuscular control of strength may be responsible for our findings.

Differences in muscle metabolism and hormonal regulation must also be considered.

There were studies in some countries to identify the areas in which the physical capacities of children are to be concentrated, and how these variations occurred. Even the countries like USA are worried about the variations in physical capacities of children because of various factors.

Richard and Ralph (2001) conducted a study on potential health related benefits of resistance training. Public health guidelines primarily focus on the promotion of physical activity and steady states aerobic exercise which enhances cardio respiratory fitness and has some impact on body composition. However, research demonstrates that resistance exercise training has performed effects on the musculoskeletal system, contributes to the maintenance of functional abilities and prevents osteoporosis, sarcopenia, lower back pain, and other disabilities. More recent seminal research demonstrates that resistance training may positively affect risk factors such as insulin resistance, resting metabolic rate, glucose metabolism, blood pressure, body fat and gastrointestinal transit time, which are associated with diabetes, heart disease, and cancer. Research also indicates that virtually all the benefits of resistance training are likely to be obtained in two 15 to 20 minutes training sessions a week. Sensible resistance training involves precise controlled movements for each major muscle group and does not require the use of very heavy resistance. Along with brief prescriptive steady-state aerobic exercise, resistance training should be a central component of public health promotion programs.
Westcott, et al (2001) investigated the effect of regular and slow speed resistance training on muscle strength. The study assessed a way to increase the intensity and effectiveness of resistance training by comparing training with slower repetition speed training with conventional repetition speed. Slower repetition speed may effectively increase intensity throughout the lifting phase while decreasing momentum. Two studies were done with untrained men (N=65) and women (N=82), (mean age = 53.6) who trained two to three times per week for 8 to 10 weeks on 13 exercise Nautilus circuit performing one set of each exercise. Participants exclusively trained using regular speed repetitions for 8 to 12 repetitions per set at 7 second each (2 second lifting, 1 second pause, 4 seconds lowering) or a super slow training protocol where they completed 4 to 6 repetitions per set at 14 second each (10 second lifting, 4 second lowering). All of the participants were tested for either the 10 repetition-maximum (RM) weight load (regular speed group) or the 5-RM weight load (slow-speed group).

In both studies, super - slow training resulted in about 50% greater increase (P < 0.001) in strength for both men and women than regular speed training. In study 1, the super slow training group showed a mean increase of 12.0kg and the regular speed group showed an increase of 8.0 kg increase (P < 0.001). In study 2, the super-slow training group showed 10.9 kg increase and the regular speed group showed an increase of 7.1 kg (P < 0.001). Super-slow training is an effective method for middle aged and older adults to increase strength. Although studies still need to be done with at risk populations, repetition speed should be considered when prescribing resistance training.

Fatouros, et al (2002) conducted study on Effects of Strength Training, Cardiovascular Training and Their Combination on Flexibility of Inactive Older Adults. The purpose of this study was to investigate the effects of aerobic training, strength training and their combinations on joint range of motion of inactive older individuals. Thirty two inactive older men (65 -78 years) were assigned to one of four groups (n= 8 per group): control (C), strength training (ST), cardiovascular training (CT), and combination of strength and aerobic training (SA). Subjects in the S.A, and SA trained three times a week for 16 weeks. ST included 10 resistance exercises for the major muscle groups at an
intensity of 55-80 % of 1-RM and CT included walking/jogging at 50-80 % of maximal heart rate. Body weight and height, physical activity level and maximal oxygen uptake (VO2max) were measured before the training period. Isokinetic (60 and 180 deg xsec⁻¹) and concentric strength (1-RM in bench and leg press) were assessed prior to and at the end of the training period.

Hip flexion, extension, abduction, shoulder extension, flexion, and addiction, knee flexion, elbow flexion and sit- and reach scores were determined before and at 8 and 16 weeks of training. There were no differences between groups in VO2max, body weight, and height (P < 0.05). ST and SA but not CT and C increased isokinetic and concentric strength at the end of the training period (P < 0.05). ST and SA increased significantly (P < 0.05) sit and reach performance, elbow flexion, knee flexion, shoulder flexion, and extension and hip flexion and extension both at mid- and post- training. CT increased (P < 0.05) only hip flexion and extension at post training. Results indicate that resistance training may be able to increase range of motion of a number of joints of inactive older individuals possibly due to an improvement in muscle strength.

Kraw and Hirchland (2002) examined 4458 American school children on a battery of six muscular strength tests. These tests according to Kraw and Hirchland, represented minimum fitness tests, that is a level of strength and flexibility in certain key muscular groups below which functioning of the whole body as a healthy organism seemed endangered. Kraw and Hirchland noted that the patient whose physical fitness level fell below these minimum requirements appeared to be “sick people”.


This activity is to increase the heat throughout the body and reduce the risk of musculoskeletal injury by increasing tissue suppleness. Stretching follows to further reduce the risk of injury, reduce muscle tension and increase freedom of movement. However, there are numerous articles indicating that pre-event
static stretching can impair force (Behm and Kibele, 2007; Behm et al., 2001; 2006), balance, reaction and movement time (Behm et al., 2004b) and jump landing contact time (Power et al., 2004). Although Nelson et al. (2001) found that the deleterious effect of prior stretching was limited to slower isokinetic velocities (60°/s and 120°/s), other studies have found prior static stretching to inhibit dynamic jump performance (Behm et al., 2006, Behm and Kibele, 2007; Young and Behm 2002,). Whereas increased ROM is coupled with performance impairments when static stretching is implemented, pre-event massage might improve ROM without the associated impairments. It would be important to discover if there are any massage-related impairments and if they could affect dynamic jump performance.

Lorry Costa (2003) explained that the human body is made up of different systems, among them the muscular, nervous, skeletal, lymphatic, cardiovascular, and digestive systems. Each system is affected, either directly, by massage. After a massage you might expect your muscles to be relaxed, senses to be heightened, skeletal system to be realigned, lymphatic system to be cleansed, circulation to be improved and digestive system to function more smoothly. (Disorders such as constipation can be alleviated through massage.

The physical benefits of massage are inextricably linked to an improved state of mind. Anxiety levels decrease and people tend to sleep better after a massage. A well-rested person suffers less from exhaustion and fatigue and deals more effectively with stress. At time of stress massage can be performed on some specific parts like head massage and massage over the soles of the feet.

Maria Eugenia Pena Reyes, et al(2003) conducted a study on urban - rural contrasts in the physical fitness of school children in Oaxaca,,Mexico.Two measures of performance related fitness (standing long jump,35 yard dash(32),and four measures of health related fitness(grip strength, sit and reach, distance run) were taken on 355 rural(173 boys,182 girls) and 324 urban (165 boys,161 girls)school children,6-13 years of age .Urban children were significantly taller and heavier than rural children.
Absolute grip strength did not consistently differ between rural and urban children, but when adjusted for age and body size strength was greater in rural children. Explosive power (standing long jump) and abdominal strength and endurance (timed sit-ups) were better in urban than in rural children without and with adjustment for age and body size. Urban-rural differences in remaining speed (dash) and flexibility (sit and reach) varied by age group and sex. Younger rural children and older urban girls performed better in the distance run, whereas older rural and urban boys did not differ in endurance.

The size advantage of urban children does not necessarily translate into better level of performance and health-related physical fitness. The observed differences may be related to activity habits associated with school physical education and lifestyle in respective communities.

Sailendra Nath Maity & Subhash Chandra Samantha (2003) conducted a study on survey of physical fitness for fifth grade boys and girls. This study had been conducted over a year on 2226 boys and 2000 girls of fifth grade from several districts of West Bengal. Each subject was tested on Kraus-Weber and Oregon Motor fitness test to assess minimum muscular strength and Motor fitness respectively. Data collected from survey on Kraus-Weber test for minimum muscular strength was analyzed on (i) percentage of passing and failure, (ii) percentage of muscle weakness and (iii) percentage of flexibility failure. The survey results revealed that the percentage of passing and failure of boys and girls were identical whereas the boys were superior in muscular strength to girls and the girls were superior to boys in flexibility measures. Results of the survey on motor fitness as assessed on Oregon Motor fitness test revealed that the boys were better than girls in leg strength and power, abdominal strength and endurance. Based on the scores for motor fitness collected from the survey on Oregon Motor fitness test percentile scales for boys and girls were contrasted. From this percentile scales and with certain guide lines separate norms for fifth grade boys and girls were developed.
Seguin and Nelson (2003) conducted a study on benefits of strength training for Older Adults. Aging is associated with a number of physiologic and functional declines that can contribute to increased disability, frailty, and falls. Contributing factors are the loss of muscle mass and strength as age increases, a phenomenon called sarcopenia. Sarcopenia can result or be exacerbated by certain chronic conditions, and can also increase the burden of chronic disease. Current research has demonstrated that strength training exercises have the ability to combat weakness and frailty and their debilitating consequences. Done regularly (e.g., 2 to 3 days per week), independence, and vitality with age. In addition, strength training also has the ability to reduce the risk of osteoporosis and the signs and symptoms of numerous chronic diseases such as heart disease, arthritis, and type 2 diabetes, while also improving sleep and reducing depression. This paper reviews the current research on strength training and older adults, evaluating exercise protocols in a variety of populations. It is clear that a variety of strength-training prescriptions from highly controlled laboratory-based to minimally supervised home-based programs have the ability to elicit meaningful health benefits in older adults. The key challenges as this field of exercise science move forward are to best identify the most appropriate strength training recommendations for older adults and to greatly increase the access to safe and effective programs in a variety of settings.

Stone (2003), Prentice (2004), and O’Shea (2005) stated that Strength is the ability to produce force. Force production can occur at zero velocity (isometric strength) or result in a variety of velocities of contraction, depending upon the resistance being overcome (dynamic strength). Thus, maximum strength can be measured isometrically or dynamically. Dynamic strength can be measured eccentrically, concentrically or plyo-metrically. Speed-strength is the ability of the neuromuscular system to produce the greatest possible velocity of movement as a result of applied force against a given resistance. Explosive exercises are defined, for this discussion, as those exercises in which the initial rate of concentric force production is maximal, or near maximal and maximal or near maximal force production is maintained throughout a specified range of motion in keeping with the exercise technique involved. Thus, explosive exercises are movements in which rapid initiation of force
production and the ability to accelerate are of primary importance. Because of the force production characteristics, the velocity of movement will be maximum or near maximum for a given resistance. Thus, a continuum of explosive exercise movements can be conceptualized, ranging from high force, slow movements (very heavy weights) to very fast movements performed with relatively light weights. However, actual exercise velocity in large part reflects the muscle length - tension curve, muscle force - velocity curve, body morphology, neuromuscular co-ordination and reflex activity and also the storage and use of elastic energy.

Hakkinen (2004) conducted a study of Effectiveness and safety of strength training in rheumatoid arthritis. As muscle weakness is common in patients with rheumatoid arthritis (R.A), strength training is considered to be an important cornerstone of the non pharmacological treatment. The training methods have varied widely between the studies. Thus the purpose of this review is to discuss effectiveness and safety but also basic principles and specificity of strength training.

Moderate or high intensity strength training has been effective and well - tolerated method to increase or maintain muscle strength in patients with rheumatoid arthritis.

No deleterious effects on disease activity and pain were observed. More information is needed regarding long term effects of strength training on functional capacity, bone mineral density and radiologic progression.

Marzilli, et al (2004) investigated on effect of community- based strength and flexibility program on performance based measures of physical fitness in older African- American Adults. With the rapid growth of the number of Americans aged 65 or older resulting in expectations of doubling the number of the population in that age bracket, health professionals and fitness experts will be called upon to develop and implement methods for keeping this population as healthy as possible for as long as possible, and to aid these individuals with retaining their quality of life. This study examined whether incorporating a low-cost ,community based strength and flexibility program would improve performance based measures of strength, flexibility and endurance in older
(57 to 82 years; M = 68 years, SD = ± 5 years) of African-American adults. Evaluated components were upper body strength (maximal amount of weighted arm curls), lower body strength (maximal amount of chair-ups), upper body flexibility (back-scratch), lower body flexibility (modified sit-and-reach) and aerobic endurance (maximal distance covered in 6 minutes). Twenty African-American adults (5 male and 15 female) volunteered to participate in five weeks of strength and flexibility training (twice per week, 60 minutes per session). Posttest results showed performance improvements for all five measured parameters, with significant improvements found for upper and lower body strength and lower body flexibility. Additionally, the structure of this exercise program resulted in adherence rates of more than 80%. In light of these findings, it is important that the design of strength and flexibility programs for older adults be implemented through the collaboration of health professionals and fitness experts; it is with this multifaceted approach to aging that an improvement in quality of life in later years can be achieved successfully.

Bik Chow, et al (2005) conducted a study on compare health-related physical fitness in Hong-Kong youth with and without intellectual disability. A stratified random sample of 457 youth with mild ID (272 boys, 185 girls, CA 6-8 years) completed 6/9 minutes-run, sit-up, sit and reach and sum of skin fold evaluations. Fitness data for youth without ID were obtained from previously established norms. MANOVA (Age X gender) and trend analysis were used to examine fitness in youth with ID.

Sample tests were used to compare fitness performance between youth with ID, and established norms for youth without ID. Males with ID performed better on the 6/9 minute run (P = 0.03), sit-ups (P = 0.02) and had lower skin fold measures (P = 0.01) than females, while females performed better on the sit and reach (P = 0.01) than males. The youth ID demonstrated lower scores on the 6/9 minute run compared to those without ID (P = 0.04), but performance on other test items varied according the age and gender. There were few differences in physical fitness between Hong-Kong youth with and without ID; however, both groups appeared extremely unfit compared to peers in other developed countries.
Lopez Blanco. M, et al (2005) presented in their study about the height and weight of 28,752 urban and 10,557 rural individuals aged birth 0 to 18 years were measured as part of a cross sectional national survey (project Venezuela) between 1981 and 1986. The Preece-Baines model 1 was fitted to the means; pooled residual mean squares of 0.21 and 0.13 in height and 0.44 and 0.13 in weight, for boys and girls respectively, indicated a good fit.

Derived means and biological parameters were compared. The nutritional status of 18,849 children aged birth to 8 years was assessed using the WHO-recommended NCHS/CDC 3rd or 10th and 90th centuries as cut-off points for weight for height, weight for age, and height for age. A t test for proportions was used to test significance. Urban children were taller and heavier than their rural counterparts; differences were evident after age 2 and maximal at 14 years in boys and 12 years in girls, due to differences in tempo, although part of the differences persist into adulthood. Prevalence of wasting and stunting were 3.5% and 10.5% higher in rural children and overweight was 3.6% higher in urban children, significantly so in higher for age. A mixed nutritional problem is present in Venezuelans, with prevalence of stunting greater than that was wasting and a prevalence of overweight greater in urban children. Urban-rural differences in growth persisted into adulthood in boys while rural girls were similar to urban girls at the end of growth.

The childhood variation in physical fitness due to variations in regions, culture etc may be carried even to adulthood and hence extensive studies on adult physical fitness on the basis of regional variations, cultural variations and genetical variations are taken throughout the world.

Ozdirence M, et al (2005) conducted a study to explore that in a crowded modern world it is vital that the promotion of sport and exercise should be compatible with environmental and public health outcomes. This study aims to investigate the effects of environmental factors. METHODES: A cross-sectional observational study of 98 rural and 74 urban healthy children (aged 9-11 years) was conducted in Turkey. A questionnaire was used in collecting information about the children’s physical activity habits and their school’s facilities. The physical fitness of children was evaluated with EUROFIT test battery. RESULTS: The rural children preferred to play football and volleyball
while the urban children a tendency to prefer indoor sports. The percent of urban children not involved in any sports activity was 35%, while this rate was 30.6% for rural children. It was also found that the urban children watched TV more than the rural children (13.4 ± 2.7 h/week, 10.9 ± 2.7 h/week, respectively). The results showed that body mass index and skin folds thickness were higher in the urban children (P < 0.05). There were no significant differences in the hip-waist ratio or the hip and waist circumference between the two groups. In cardiopulmonary and motor fitness, no difference was found between the two groups. In contrast, flexibility and muscle endurance were significantly higher in the rural children.

CONCLUSION: The children living in the urban areas were more inactive and obese, which resulted in a decrease in their flexibility and muscle endurance fitness.


METHODS: The sample consisted of 360 (189 urban and 171 rural: age 12.3 ± 0.43 years) girls. The sample was highly representative (32-64%) of all 12 year old children registered in the prefecture of Trikala, Greece. All volunteers were assessed to BMI and %body fat, as well as sit and reach, basketball throw (BT), vertical jump (VJ), handgrip strength (HG), 40m sprint, agility run, and 20m shuttle run. To correct for possible associations between fatness and fitness, a single cause algometric scaling was employed using the natural logarithm (ln) of fitness parameters that were significantly correlated with the ln body fat. Results: Independent-samples t test revealed that VJ (P = < 0.05) was significantly higher in boys living in urban settings compared to their rural counter parts. Similarly, BT was found to be significantly better (P = < 0.05) in urban girls, whereas HG was significantly higher (P < 0.05) in rural girls. Conclusion: Considering that (a) only three out of the 14 possible causes (seven fitness parameters for boys and seven for girls) were significantly different between urban and rural children, and (b) these differences were not uniformly distributed in children living in either urban or rural environments, it
is concluded that the place of residence has no clear impact on physical fitness as studied herein.

Yanping, et al (2005) conducted a study on Body image perceptions among Chinese children and adolescents. 9100 children aged 3-15 years living in four cities completed a questionnaire assessing body image self -percepts and ideals by figural stimuli. The results indicate that children’s body ratings started to be significantly related to their BMIs at age of 5 and correlations increased with age.

A wide range of current body size was chosen by Chinese boys and girls. The ideal body sizes of boys and girls selected by boys and girls, respectively were “boys by boys” > “boys by girls” >“girls by boys” >“girls by girls”. The satisfaction, mild dissatisfaction, and moderate dissatisfaction rates were 40.1%, 36.4%, and 23.5% respectively. Differences as a function of gender and age were identified. It was concluded that the prevalence of body dissatisfaction among children and adolescents of urban china was striking, and that the Chinese boys were not immune to body dissatisfaction.

While Hunter et al (2006) reported that post massage effects on isokinetic force were only significant at 60°/s; they also opined that the deleterious effect might only occur with the first contraction after massage. With the incertitude in the literature it would be opportune to further investigate the effect of massage on jump measures.

Massage involves methodical pressure, friction and rubbing (Hemmings, 2001). Various strokes such as, effleurage, petrissage, tapotement and frictions have been developed from Swiss massage. Petrissage (“to knead”) is a vigorous stroke, which compresses and releases soft tissue via picking up and squeezing the muscle and overlying tissues. It is aimed at stretching muscle fibers, increasing mobility between the tissue interfaces, aiding venous and lymph return, relaxing muscles, and in helping with the removal of wastes (Goats, 1994a; Paine, 2000).

Tapotement is a percussive massage stroke, such as hacking, pecking or cupping; aimed at stimulating the cutaneous tissue and superficial muscle, aiding the preparation for competition (Goats, 1994b; Paine, 2000).
Unfortunately, the factions that prescribe pre-event massage do not agree on the type, style, application, duration, intensity, number of strokes, or the time prior to competition required to benefit from massage (Caldwell, 2001; King, 1993; Paine, 2000).

In addition, limited empirical data was found to substantiate each stroke’s claimed benefit or if they had any effect at all. Therefore, both practitioner and recipient may have a poor understanding of the true nature of massage.

Currently, the majority of studies, on sports massage, focus on post-event conditions specifically aiding recovery from intense exercise and the relieving of delayed onset of muscular soreness symptoms (Weber et al., 1994). Very little research has been conducted on the pre-exercise or pre-event condition (Hemmings, 2001). Although various authors have speculated on the positive effects of massage (Cafarelli and Flint, 1993; Caldwell, 2001; Hemmings et al., 2000; Hemmings 2001; King, 1993; Paine, 2000), there is little scientific or empirical data to support these claims (Boone et al., 1991; Hemmings et al., 2000; Shoemaker et al., 1997). Furthermore, these studies have methodological problems. Duration of the treatment and the type and number of strokes conducted during the treatment are inconsistent, with these decisions often left up to the discretion of the therapist applying the treatment (Wiktorsson-Möller et al., 1983). Consequently, scientific knowledge in the area of the pre-event massage is lacking. There is insufficient evidence to suggest that pre-event massage is of any physiological benefit, whether it has a positive or negative effect on performance and ROM. Hence, the purpose of the study was to establish whether particular massage strokes (petrissage or tapotement) had any effect on power performance of the plantar flexors and ankle joint flexibility immediately post-treatment.

Study was conducted to determine if three minutes of petrissage and tapotement forms of massage would influence plantar flexors' flexibility, and muscle power. Nineteen participants were randomly subjected to three conditions (control and two massages) before performing two power tests. Prior to the intervention, subjects completed ankle joint flexibility assessments.
The conditions were; (1) control, where subjects lay prone and had a therapist’s hands resting, (2) vigorous petrissage, and (3) tapotement applied at a rate of 4Hz; all on the triceps. Following completion of the intervention, subjects immediately completed a post-ankle joint flexibility test, followed by a drop-jump and concentric calf raise. The power measures were; concentric peak force, rate of force development, and drop-jump height / contact time. The data showed a significant increase ($p < 0.05$) in ankle joint angle on the right leg and a corresponding tendency on the left. No significant change was seen with the power measures. Results suggest that massage can increase plantar flexors’ flexibility without a change in power and thus may be an alternative to static stretching during an athletic warm-up. (Journal of Sports Science and Medicine (2007). 6, 498-504, http://www.jssm.org).

It is well explained in http://www.en.wikipedia.org that Massage is the working of superficial and deeper layers of muscle and connective tissue using various techniques, to enhance function, aid in the healing process, and promote relaxation and well-being. The word comes from the French massage "friction of kneading", or from Arabic Massa meaning "to touch, feel or handle" or from Latin Massa meaning "mass, dough", from Greek verb mass "to handle, touch, to work with the hands, to knead dough". In distinction the ancient Greek word for massage was anatripsis, and the Latin was frictio.

Massage involves working and acting on the body with pressure - structured, unstructured, stationary, or moving - tension, motion, or vibration, done manually or with mechanical aids. Target tissues may include muscles, tendons, ligaments, fascia, skin, joints, or other connective tissue, as well as lymphatic vessels, or organs of the gastrointestinal system. Massage can be applied with the hands, fingers, elbows, knees, forearm, and feet. There are over eighty different recognized massage modalities. The most cited reasons for introducing massage as therapy have been client demand and perceived clinical effectiveness.

In professional settings massage involves the client being treated while lying on a massage table, sitting in a massage chair, or lying on a mat on the floor. The massage subject may be fully or partly unclothed. Parts of the body may
be covered with towels or sheets. Those who practice massage as a career are referred to as massage therapists. Most states in the US have licensing requirements for massage therapists.


Abuhallimen (2007) in his study investigated the effects of two 10-week training programs on self concept and student attitude towards physical activity of Jordanian College of Physical Education majors aged 18-21 years old. 72 male and female subjects were randomly assigned to either a weight training program group or an aerobic training group. Each group participated twice a week for 50 minutes in either a weight training group or an aerobic training group for a period of 10 weeks. The two groups were pre and post-tested on Tennessee self concept scale (TSCS) AAPHERD youth test and the Kenyan Attitude toward physical activity inventory. The students F test the hypothesis. The result showed that both groups significantly increased from pre to post-test in their total self concept and total attitude towards physical activity. There were no correlations between physical fitness gain scores and total positive self concept gain score and total attitude toward physical activity gain score within wither group.

Ignacio Ara, et al (2007) conducted a study to determine the relationship between physical activity levels and adiposity and also to assess the effect of physical fitness and living area on adiposity. A cross-sectional study was carried out in a regional representative sample of 1068 children 7 to 12 years of age.

Anthropometric and physical fitness values (including BMI, aerobic capacity, strength levels, velocity assessments and flexibility) were measured in all children. The prevalence of being overweight and obese in the entire sample was 31% and 6% respectively. No difference between urban and rural children was found. The proportion of boys who were classified as overweight and obese was similar in physically active and sedentary (non-physically active) groups. However physically active girls tended to show lower obesity prevalence compared with their sedentary counterparts(P=0.06).In girls, the sum of the 6 skin folds thickness (SSF) measurements were lower in the
physically active group when compared with the non-physically active group (P < 0.05); however, this effect was not observed in boys. Multiple regressions analysis revealed that the level of physical activity (PA) had a significant effect on BMI and SFI in boys but not in girls, while maximal oxygen uptake (VO2max) was significantly related to adiposity in both sexes.

Journal of Sports Science and Medicine (2007) well stated that the practice of massage has long been considered an integral part of sport preparation, conditioning and recovery (Cafarelli and Flint, 1993; Caldwell, 2001; Drust, et al., 2003; Harmer, 1991; Hemmings, 2001; Tiidus and Shoemaker, 1995). Since the time of ancient Greece, massage and sport have co-existed. However, it was not until the 1972 Munich Olympics where Lasse Viren attributed his two gold medals to a daily massage (Caldwell, 2001), that massage became synonymous with sporting achievement. In addition, more recently Callaghan (1993) and Clews (1999) reported extensive use of massage on their national Olympic teams.

Although massage is practiced widely throughout sporting circles, the effects and mechanism associated with massage are unclear or anecdotal (Boone et al. 1991, Wiktorsson-Möller, et al., 1983; Cafarelli and Flint, 1993; Harmer, 1991; Hemmings, 2001; Tiidus and Shoemaker, 1995). Athletes use massage in an attempt to aid recovery as well as warm-up for training or competition (Boone et al., 1991; Cafarelli and Flint, 1993; Caldwell, 2001; Cash, 1996; Toru Namikoshi (2007) explained that Acupressure is an ancient healing art that uses the fingers to press key points on the surface of the skin to stimulate the body’s natural self-curative abilities. When these points are pressed, they release muscular tension and promote the circulation of blood and the body’s life force (sometimes known as qi or chi) to aid healing. Acupuncture and acupressure use the same points, but acupuncture employs needles, while acupressure uses the gentle, but firm pressure of hands and feet. Acupressure continues to be the most effective method for self-treatment of tension-related ailments by using the power and sensitivity of the human hand. Acupressure can be effective in helping relieve headaches, eye strain, sinus problems, neck pain, backaches, arthritis, muscle aches, tension due to
stress, ulcer pain, menstrual cramps, lower backaches, constipation, and indigestion. Self-acupressure can also be used to relieve anxiety and improve sleep. There are also great advantages to using acupressure as a way to balance the body and maintain good health. The healing touch of acupressure reduces tension, increases circulation, and enables the body to relax deeply. By relieving stress, acupressure strengthens resistance to disease and promotes wellness. In acupressure, local symptoms are considered an expression of the condition of the body as a whole. A tension headache, for instance, may be rooted in the shoulder and neck area. Thus, acupressure focuses on relieving pain and discomfort, as well as responding to tension, before it develops into a disease—before the constrictions and imbalances can do further damage. The origins of acupressure are as ancient as the instinctive impulse to hold your forehead or temples when you have a headache. Everyone at one time or another has used their hands spontaneously to hold tense or painful places on the body. More than five thousand years ago, the Chinese discovered that pressing certain points on the body relieved pain where it occurred and also benefited other parts of the body more remote from the pain and the pressure point. Gradually, they found other locations that not only alleviated pain, but also influenced the functioning of certain internal organs. (Definition, in part, from the book Acupressure’s Potent Points, by Michael Reed Gach, director of the Acupressure Institute, Bantam, 1990).

Mandep Singh, et al (2008) conducted a study of selected health related fitness components of high school Boys in Kerala, Madhya Pradesh, Punjab, Rajasthan, Maharashtra, and Jammu and Kashmir, India. In this study randomly selected 300 untrained High School boys from different states namely Kerala, Madhya Pradesh, Punjab, Rajasthan, Maharashtra, and Jammu and Kashmir. From each state at least two schools were selected and from each school unequal numbers of students were selected depending on the strength of the school. The data pertaining to selected health related fitness variables such that a weight, height, cardiovascular efficiency, flexibility, abdominal strength, endurance and skin fold measurement of different sites were collected by administrating the appropriate testes and
measurements, procedures and the tests involves proper administration and measuring of body stature (height, body weight), body fat (skin fold measurement), cardio respiratory endurance (HST), flexibility (wells and Dillon sit and reach test) abdominal endurance (sit-ups). Mean, standard deviation and percentiles were computed for each health related fitness components of high school boys of various schools in given six states of India. Most of the high school boys selected for the study had not performed well in field tests. Subjects of this study did not having any compulsory physical education programme. Majority of the high school boys involved in the study from Kerala, Madhya Pradesh, Punjab, Rajasthan, Maharashtra, and Jammu and Kashmir were found to have weak rectus abdominal muscles, low cardio-physical fitness, more body fat and average flexibility.


This study was designed to examine the associations of physical activity and body composition with cardio respiratory fitness in eight grade girls. A random sample of 1440 eight grade girls at 32 schools participated in this cross-sectional investigation, which represented an ethnically and geographically diverse group. Cardiorespiratory fitness was assessed using a modified physical work capacity test on a cycle ergometer that predicted workload at a heart of 170 beats per minute. Physical activity was assessed in each girl using an accelerometer and body composition was estimated from body max index and triceps skin folds using a previously validated equation. Person correlations and multiple regressions analysis were used to determine the relationships among fitness, physical activity and body composition. Significant linear relationships among cardio-respiratory fitness, body composition, and physical activity were found. The combination of fat and fat-free mass along with racial group and a race by fat-free mass interaction accounted for 18% ($R^2$) of the variation in physical fitness. Adding moderate-to-vigorous physical activity to the regression model increased the $R^2$ to 22%. Black girls had somewhat lower fitness levels ($P < 0.05$) especially at higher level of fat and fat-free mass than other racial/ethnic groups.
Physical activity, fat-free mass and the interaction between fat-free mass and racial groups are significantly associated with cardio-respiratory fitness in adolescent girls.

Young (2008) in his study investigated the relationship between strength measures and sprinting performance, and to determine if these relationships varied for different phases of sprinting training. Twenty (11 male and 9 female) elite junior track and field athletes served as subjects. Athletes performed maximum sprints to 50 m from a block start and time to 2.5, 5, 10, 20, 30, 40 and 50 m were recorded. The resultant forces applied to the blocks were obtained from two force platforms. Measures of strength and speed-strength (absolute and relative to body wt) were collected from the take off phase of vertical jumping movements utilize pure concentric, stretch shortening cycle (SSC) and Isometric muscular contractions. Pearson correlation analysis revealed that the single best predictor of starting performance (2.5 m time) was the peak force generated during a jump from a 120° knee angle concentric contraction $r = 0.86, p = 0.0001$), the single best correlate of max. Sprinting speed was the force applied at 100 ms from the start of a loaded jumping action (concentric contraction) $r = 0.80, p = 0.0001$). SSC measurers and maximum absolute strength were related to max sprinting speed than starting ability. It was concluded that strength qualities were related to sprinting performance and this relationship differed for starting and max speed sprinting.

Within a study of Hoff and Almasbakk (2009), it appears that traditional means of developing maximum strength training to increase one repetition maximum (1-RM) in the muscle groups of interest along with training of the desired movement will enhance velocity in the desired movement. Systematic, maximal, heavy, progressive resistance training yields significant improvement in maximum dynamic strength, even in the competition phase. Uppal and Tunidon (2009) studied the comparative effect of different frequencies of endurance training on cardio-respiratory endurance. According to their findings the cardio-respiratory endurance of secondary school students could be effectively improved by administering a progressive program of interval training. To bring about significant improvement in cardio-
respiratory endurance, varied frequencies of training namely twice, thrice and five days a week were employed. Endurance training workout using interval training method administered three and five days a week was more effective in developing cardio-respiratory endurance as compared to workouts twice a week.

Knerl, et al (2009) investigated the effects of six weeks of balance and flexibility training on measures of Dynamic balance of older adults. This study examined the effects of six weeks of strength training, balance training and a combination of both on dynamic balance in older adults. Fifty one seniors (17 males and 34 females) between the age of 60 and 93 years (73.2 ± 7.9 years) participated.

Four groups ,three treatment groups (strength training /ST/,balance training/BT/ and a group which combined strength and balance training /SAB/and a control group/control/ were tested on measures of dynamic balance, strength and flexibility before(pre-test)and after six weeks of exercise training (post-test). Measures of dynamic balance included the 8 Foot - Up and Go test and the combined score on the Fullerton Advanced Balance Scale (FAB-Scale).Lower and upper body strength and flexibility were assessed using components of the Senior Fitness Test (chair stand, arm curl, sit and reach and back scratch test).A repeated measure ANCOVA showed no significant differences between groups for measures of dynamic balance. Repeated measure ANOVA’s with Post Hoc comparisons indicated upper body strength and lower body flexibility increased significantly ( P<0.05) in the ST and SAB group while upper body flexibility decreased significantly (P < 0.05) in the ST group compared to all other groups. Although all treatment groups exhibited a trend for improvement, results suggest six weeks of exercise training, regardless of type, was not sufficient to elicit significant changes in dynamic balance in the present sample of older adults.

According to Stone (2009) sport-specific strength is movement with resistance or assistance that imitates the joint action of the skill. Explosive movements are required in many sports and are typically performed at high speeds against resistance, such as the weight and inertia of the body or equipment. In these sports, the explosiveness or rate at which force can be applied may be
more important than maximum force production capability (maximum strength). The optimum resistance training method for developing fast force production is not as readily accepted. Coaches are faced with practical questions such as:

How much resistance (load) should be used?
How important is the speed of movement in resistance training?
How important is it to emulate sports movements with resistance training exercises?

Banitalebi (2010) investigated the effect of exercise training in health related physical fitness factors and blood lipids profile of former addicted persons.

Dysfunctional eating patterns and excessive weight gains have been observed during recovery from drug and alcohol addictions. The purpose of this study was to determine the effect of exercise training on health related physical fitness factors and blood lipids profile of former addicted persons. Thirty seven males who were 23-49 years of old and had one year quitting history were selected and randomized (exercise group, N=18 and control, N=19). Thirty eight individuals completed the entire study; 16 persons were in exercise group and 15 persons were in control group .Exercise training was consisted primarily of some game based aerobic exercise .Exercise training duration progressed from 20 minutes at the baseline to 45 minutes at the end of weeks 12th, and intensity of exercise progressed from 50 % of heart rate reserve of baseline to 70 % in 12 weeks. Weight, BMI and WHR were measured. Muscle endurance, flexibility &VO2 Peak were measured using by pull- up, Sit and reach tests and one mile Rockport walk test respectively. Body composition was assessed using the sum of three skin fold measurement specific for males (chest, abdomen and thigh).

Total cholesterol (TC), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C) and triglyceride (TG) were measured enzymatically using diagnostic Pars Kits. All variables were measured at baseline. Data analyzed by using ANCOVA analysis. There were no significant differences in weight (P = 0.208), BMI (P = 0.2631), CT (P = 0.428), HDL...
(P = 0.833), LDL (P = 0.396), VLDL (P = 0.169), TG (P = 0.283), VO2peak (P = 0.884), flexibility (P = 0.923) and pull-up (P = 0.44) after 12 week exercise training between two groups, but there was significant difference in WHR (P = 0.044). It appears that, exercise training can prevent weight gain after quitting drugs and substances.

Noto Y, et al (2010) clearly explained massage therapy promotes physical & psychological relaxation, reduces stress and has been reported to improve the immune function in which currently used in palliative care for the relief of anxiety and pain.

Massage therapy is a multi-billion dollar industry in the United States of America with 8.7% of adults receiving at least a single session of massage within a year; yet little is known about the physiologic effects of a single session of massage in healthy individuals. Massage therapy is widely used by athletic population for a variety of purposes such as injury prevention, recovery from fatigue, relaxation, and to increase physical performances. The purpose of this study was to determine effects of a single session of Swedish massage on neuroendocrine and immune function

Shahana (2010) investigated the effect of aerobic exercise program on health related physical fitness components of middle aged women. Fitness for living in the house or on the farm or at office or factory or in work places or in any service implies freedom from disease, enough strength, endurance and other abilities to meet the demands of daily living. Doing physical activity everyday contributes to optimum health and quality of life. Life style can be changed to improve health and fitness through daily exercises. Aerobic exercise stimulates heart, lungs and all working group of muscles and produces beneficial changes in body and mind. Many physiological changes are determined by daily aerobic exercise. The purpose of the study was to determine the effect of a 12 weeks aerobic exercise program on health-related physical fitness components, which are cardio respiratory endurance, flexibility, abdominal strength, endurance and body fat in middle aged women. A total of 60 middle aged women from Karyavattom panchayath of Trivandrum district in Kerala state (India) between the age of 35 and 45 years were selected as subjects for the study. They were tasted to collect the data
on selected variables. The cardio respiratory endurance, flexibility, abdominal strength, strength and body fat percentage were selected variables. Further, 30 subjects were randomly assigned as experimental group and 30 as control group. The experimental group underwent aerobic exercise training thrice a week for 12 weeks. The control group did not attain any training program. The post tests were conducted on both groups to collect the data on the variables of the study. The data pertaining to health related physical fitness components were analyzed by paired ‘t’ test to determine the difference between initial and final mean for experimental and control groups. Significant difference seen at the 0.05 level with 29 degree of freedom is 2.756 in experimental group following 12 weeks of aerobic training program for cardio respiratory endurance, flexibility, muscular strength, endurance and skin fold thickness (body fat %). In the case of control group no significant changes were seen in any of the selected variables. The conclusion of this study was improved cardio respiratory endurance, flexibility, muscular strength, endurance and decreased skin fold thickness (body fat %) among the experimental group of middle aged women after 12 weeks of aerobic training.

Baratand Mukesh(2011) investigated a comparative study on physical fitness of secondary school students(age:13-16 years)of Central board school, Javahar Navodaya school and Adarsh residential school. This study included 400 students of all three type schools and measured physical fitness of all students.

The following test (AAHPER) youth fitness testing manual; conducted to measure physical fitness tests.1.Muscle strength(pull-ups), 2.Abdominal Endurance(sit-ups), 3.speed (4x30 yard run), 4.Explosive strength(standing broad jump), 5. Speed and explosive power (50 yard run), 6.Cardio-vascular endurance (600 yard run).

The summation of all above tests figure takes as a physical fitness index. The analysis of variance (ANOVA) test applied to measure the difference of physical fitness among all three type schools to check the difference of physical fitness in among all three type schools.
Analysis of variance test (ANOVA) was utilized which was found on 0.5 level F-ratio = 24.72 is greater than F tab(3.03). This shows that all the three type school students were in different characteristics for physical fitness. To know the significance, the least significant difference test was used. There is a remarkable difference between Adarsh residential schools and other two type schools. The students of Adarsh residential school have more physical fitness compared to other two schools. The students of Navodaya and Central board schools have an equal physical fitness. Adarsh schools gives admission of tribal students and also its residential schools. In short, we can say the tribal students are more fit with regard to physical aspects.

Dhirendra and Usha (2011) conducted study on comparison of selected strength variables of Indian Basketball players. The purpose of this study was to compare the strength variables of Indian Basketball players. The subjects were ninety players from different Universities/Statesthos who have participated in Basketball championships at various levels. The subjects were ranging from 17 to 32 years of age. Depending upon the level of participation; subjects were divided in to three groups such As beginners, the intermediate and the advanced group. The selected strength variables were Grip strength of shooting hand, Arm and shoulder strength and Explosive strength of the legs. The data for selected strength variables were obtained by using the standard procedures. One way analysis of variance (ANOVA) was employed to check the variability of selected groups. Post -hoc least significant difference test was used to find out the significant, the subjects of different groups differed significantly on the measures of Grip Strength of shooting hand and Arm and shoulder strength.

Jagdishchandra and Trupti (2011) investigated on effect of physical Education Handball Specialization Training on strength of Handball players. The study aimed to examine the effect of physical education Handball specialization training program on strength of Handball players.14 players of handball specialization from Mahadev Desai Sharirik Mahavidyalaya, Sadra were randomly selected for the study (age: 18 to 25). These subjects were trained for 8 weeks.
Grip strength of Right hand (RH), Left Hand (LH), Back Strength (BS) and Leg Strength (LS) were measured by standard strength of Dynamometer. 'T' test (p<0.05) was used for statistical analysis in the study. Comparing pre and post data it was observed that the group improved significantly p< 0.05, RH ('t'=3.72), LH ('t'=3.45), BS ('t'=5.93) and LS ('t'=6.08).

Narayankar et al (2011) conducted a study of the effect on Physical fitness & Development of Agility, Strength and Endurance of Inter zonal Men Hockey players. The name ‘hockey’ is perhaps derived from old French word “hoquet” which means a shepherd’s curved stick. The game normally 70 minutes of duration, divided into two halves of 35 minutes each with interval of 5 to 10 minutes in between. Hockey is played with curved stick flat on one side (for hitting) and rounded on the other hand a small hard ball weighing 5 (1/2) oz. 155.9 gram. Hockey is played on a ground of 100 yards long and 60 yards wide. India has got great reputation in regards with hockey. It is a national game of India.

Physical fitness can be defined as a capacity of person to work with efficiency without fatigue. Physical fitness of a man and woman are the ability to carryout daily tasks with vigor and alertness. Physical fitness includes many factors like physical strength, agility, capability, work, speed, and response of the body. Sports are the spontaneous activity which develops all round individual personality. This paper discusses the activity of every Hockey players of Shivaji University. Nine teams every year participate in the above said tournaments. 144 Hockey players of three districts were at work for one month and it was found that they were efficient in playing hockey for long and improved a lot in the natural actual active sense of skill.

Prabhulal and Amit (2011) investigated on Effect of Yoga and Gymnastics Training was to Program on selected components of physical fitness. The purpose of this study was to find the effect of yoga and gymnastics training program on cardiovascular efficiency, flexibility, muscular endurance, muscular strength, and speed. For this study 120 students were randomly selected (Age: 12 to 15). Further more these students were divided into four groups i.e. A, B, C and D respectively. Yoga, Gymnastics, Yoga-Gymnastics combined and a control group. All the Experimental groups were trained for 18
weeks. For statistical analysis ANCOVA test was used at the significant level of p<0.05. Yoga group showed significant improvement and difference in cardiovascular efficiency and flexibility while gymnastics group showed significant difference in muscular endurance and muscular strength.

Simran Jeet Singh et al (2011) investigated a comparative study of selected physical fitness variables of Male Football players of two different SAI training centers. A study has been conducted on selected physical fitness variables of male football players of SAI, NSWC Gandhinagar and SAI, NSWC Ponda, Goa, in all 32 male footballers were taken as subjects. The purpose of the study was to find out and compare the level of physical fitness between male football players of above mentioned SAI centers. To achieve the objective of the study AAPHER youth fitness test battery consisting of eight test items viz. height, weight, shuttle run, vertical jump, 30m flying sprint, standing broad jump, Sit-ups, and 2.4km run were used to measure the physical fitness level of footballers. The collected data was analyzed by 't' test. Statistically significant results were obtained at 0.05 level among the following physical fitness variables of height, weight, vertical jump, speed (30 meters fly), abdominal strength (sit-ups).

Sreedhar et al (2011) conducted a study of Effect of Resistance Training on Lipid profiles among Middle aged Men. The aim of this study was to examine the effects of low intensity resistance training on blood lipids among middle aged Indian men. Twenty four males (Age: 40.45 ± 2.67, Height: 167.67 ± 5.84, Weight: 86.10 ± 8.79, BMI: 31.24 ± 1.96) were randomly assigned to a resistance training group (N=12), or a control group (N=12). The resistance training group underwent a low intensity resistance training program for twenty-four weeks, which included a six-week preparatory training while the control group maintained three times in a week at 60% effort of their one-repetition maximum using nine resistance exercises. Each exercise was performed for three sets of 12 repetitions each with recovery period of either 30 sec or 60 sec. Height, Weight, and BMI were measured before (pre) and after (post) the training program. Blood samples were collected 24 hours before, and after the training period and analyzed for total cholesterol (TC), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C) and triglyceride.
The obtained data were statistically analyzed using ANCOVA to find out significant difference if any. The results show a significant reduction in body weight, BMI, TC, LDL-C, and TG with no significant change in HDL-C), conclusion resistance training improved lipid profiles except HDL cholesterol among middle aged Indian men.

Sushant (2011) investigated on Effect of weight training Exercise on Instep kick ability of football players. The purpose of the study was to see the effect of weight training exercise on football players of D.M’s college men football team.

Methodology-population of the study were the male football players of D.M’s college, the sample technique at the beginning was designed so as to select the sample form of D.M’s college with the help of Warner's skill test. A total of 40 subjects (N=40) assigned into two equally matched groups. To see the effect of selected exercises i.e. weight training exercises on instep kicking ability, two variables were selected.

1. Dependent variable - football instep kick
2. Independent variable- weight training exercises

Warner’s skill test was used as tool for measurement of football skill ability. The tests were administered before and after the training to collect the data of the groups. The entire study compromises of three phases. The significant difference between pre test and post test means for the effect of weight training instep kick ability of football players was analyzed by using analysis of covariance (ANCOVA) Result-The ‘t’ value for control group by calculation is 0.25 and ‘t’ value is 2.02 and that for experimental group by calculation is 4.04 and the ‘t’ value is 2.02, this shows that there is significant change. The present study shows that weight training exercise brings tangible success in the game of football.