

## CHAPTER-II

### REVIEW OF RELATED LITERATURE

The investigator had done sincere efforts to locate the literature concerned to the present study. Various researchers had tried to explain the impact of feedback in skill learning. Different studies showed different result with some level of difference. A brief account of the same is given in this chapter.

#### SAQ (SPEED, AGILITY, QUICKNESS) TRAINING

**Polman et al. (2004)** studied compared the impact of three physical conditioning programs which were given over a period of 12 weeks' to female soccer players. Specialized speed and resistance equipment, equipment group were used for one group, while traditional training equipment, non-equipment group were used for the second group. The third group followed their usual fitness session pattern. The number of participants in every cluster was twelve. It had been found that conditioning primarily based upon speed, agility, and quickness SAQ was effective significant improvement in physical condoning of feminine or female soccer player. However, the research worker additional found that there was no would like for specialised SAQ training equipment.

**Bloomfield et al. (2007)** examined the effectiveness of 2 methodologies for speed and agility acquisition or conditioning for random, intermittent, and dynamic activity sports. Two batches got either a programmed methodology or a random methodology of acquisition. The third batch received no acquisition. Programmed acquisition participants got the plan of action whereas and random acquisition participants performed supervised small-sided field game games. Programmed conditioning was conjointly divided into two batches wherever participants either used special SAQ instrumentation or no instrumentation. A complete of 46 untrained participants were being taken for the purpose of the study from which 25males and 21 females received 12.2 +/- 2.1 hours of physical conditioning over 6 weeks. Two-way analysis of variance (ANOVA) results mirrored that each conditioning batches showed an understandable decrease in body mass index. However, though bigger enhancements

on acceleration, speed, leg power, balance were seen just in case of programmed conditioning. Programmed conditioning within the kind of SAQ exercises were found to be a superior methodology for rising speed and agility. The study conjointly more analysis is additionally needed to determine whether or not these benefits transfer to sport-specific tasks.

**Singh (2008)** examined the impact of SAQ drill on volleyball player's skills. The subjects were divided into two batches. fifty junior and fifty senior male volleyball players from Delhi state collaborating in junior and senior national, school national and university level championship conducted by VFI, SGFI and AIU were selected as subjects. Random sampling was used for the study. The subjects were assigned into experimental batch and control batch in every batch for junior moreover as senior. Each cluster or cluster consisted of fifty participants. Measure of performance ability was finished each batches before, intermediate (after six weeks) and once the experimental time of twelve weeks. Statistical analysis of the data was done by applying ANCOVA. The results of the study indicated that the participants who used the treatment of SAQ drills had higher skills than the participants up to control batch for every levels. It further indicated that SAQ skills had an extremely positive and noticeable impact on the performance of the experiment batch players.

**Polman et al. (2009)** conducted associate empirical study to analyze the result of SAQ and random conditioning methods on chosen neuromuscular and physical performance variables. 20 volunteers or subjects were taken to finish the study. The study style cafterned the employment of rigorous experimental conditions and a non exercise control group. Every 1 hour session enclosed quarter-hour of general preparation and a 45 - minute exercise session. There was a 6.9% larger improvement in 5-m acceleration time and 4.3% in 15-m mean running speed time for the SAQ group compared with the SSG group. Additionally, will increase in top isokinetic cafterntric strength for each the striated muscle and striated muscle muscles, with the exception of a hundred and eighty degrees /s flexion, were larger within the SAQ than SSG condition. The SAQ group additionally showed 19.5% larger gain in reactive strength and 53.8% in mean skeletal muscle medialis

activity compared with SSG. SAQ training ought to profit the physical conditioning programs of novice players performing arts invasion games.

**Jovanovic et al. (2011)** studied the result of speed, agility, and quickness training method on power performance. The elite soccer players were electing for the study. Elite soccer players were appointed into two batches using the random sampling technique. The experimental batch and control batch consisted of fifty players each. At the beginning of coaching or training, the initial testing procedure was given. The eight week specific SAQ training program was implemented at the moment final testing happened. The results of the two way analysis of variance reflected that the experimental group's performance improved significantly.

**Mehroetra et al. (2011)** examined the results of SAQ drills programme of six weeks on mensuration or anthropometrical variables. The subjects were thirty male hockey players that belonged to Varanasi. Height and weight were the measurement variables that were used for this study. The data was collected before and once or after six weeks of coaching. The applied applied math tool used was analysis of co - variance (ANCOVA) technique and conjointly the level of significance was fifth level of significance. The findings of the study powerfully indicated that S.A.Q drills programme of six weeks had a remarkably positive impact on the chosen menstruation or anthropometrical variables employed in the study.

**Bujjibabu and Johnson (2012)** analysed the ramifications of Plyometric coaching and speed, agility, and quickness (SAQ) training on variables like speed and agility of male handball players. Thirty male handball players' happiness to SAI sports coaching center Saruranagar, Hyderabad and province were chosen as subjects. Three groups were made out of these subjects. These groups included Plyometric training, SAQ training and control group. Each group consisted of 30 subjects. Pre-test (initial test) and post-test (after test) data were measured on the handball field in order to compute the results. The statistical analysis was made by applying analysis of covariance (ANCOVA). It was evident from the present research that the adjusted post-test mean was significant on speed [ $f(2, 26)=3.592, p<0.05$ ] and agility [ $f(2,26)=46.88, p<0.05$ ]. Further, it was also found that SAQ training remarkably improved the speed and agility of handball players compared to Plyometric and control groups. 2.02 % and

7.17 % of improvement were seen on the parameters such as speed and agility of male handball players.

**Mitra (2012)** researcher investigated the influence of SAQ program on the skills and performance ability of cagers. To achieve the objectives, they studied 60 national / Inter - university/state level male cagers of West Bengal. All of them were selected randomly as subjects, the age of whom ranged between 18-23 years. Three batches were formed out of which two were experimental batches namely speed-agility-quickness training with equipment group (SAQE) and speed-agility- quickness training without equipment group (SAQNE) and one was active control batch (AC). All 3 batches were tested before initiating the treatment at the completion of six weeks, and then, after the experimental period of 8 weeks. It was observed that there was a vital development in the elected motor fitness components as power, agility, speed and cardio-respiratory endurance in both the speed-agility-quickness training batches in comparison to the active control batch. The results of the research suggested that the rate of development in basketball performance as well as the selected motor fitness components is greater in the early stage, i.e., 6 weeks; while it is lower afterwards (eight weeks). The research also suggested that significant enhancement in basketball performance and in the selected motor fitness components of the players is possible without specific SAQ equipments.

**Milanovic et al. (2013)** investigated the impact of a twelve weeks SAQ programme on agility with and without the ball among young soccer players. The subjects were divided into two batches. Sixty six subjects were appointed to the experimental batch and sixty six subjects were kept in the control batch. Field test slalom, slalom with ball, sprint with ninety turns, sprint with ninety turns with ball, sprint with a hundred and eighty turns and sprint with backward and forward running sprint 4 × 5m take a look at were accustomed analyse agility performance. It was evident from the present research that there have been statistically vital enhancements between pre and post training for nearly all live of agility, with and without the ball. This study instructed that SAQ training is a crucial and indispensable manner of up agility with and without the ball, for young soccer players.

**Mohanasundaram (2013)** examined the results of SAQ training and tempo training on agility and resting rate among junior cricket players. The subjects were 45 in vary or range and were elect from the Stansford International Higher lyceum, Pondicherry. Subjects age ranged between fourteen to seventeen years old. Subjects were equally divided into three batches with fifteen subjects in each batch. The first batch received SAQ training, batch second was treated with tempo training third was treated with control batch. The training was given for a period of twelve weeks. The results of before (pre-test) and after (post-test) were statistically analysed with application of analysis co-variance. The ends up in comparison between the two experimental batches discovered that resting heart rate had no noticeable improvement due to SAQ training and tempo training as compared to the control batch. But light-weight sameness had important improvement due to SAQ coaching and tempo coaching as compared to the management cluster. The result discovered that it had been found that S.A.Q coaching cluster had positive and noteworthy impact on agility.

**Pathak (2013)** The researcher scientifically studied the effectiveness of modern training program on speed, agility and quickness in relation to body types. 120 female students aged between 14 to 18 years from city school of Lucknow were used as subjects using the technique of random sampling. Control group & experiential groups were formed whereby each group included 60 subjects. The subjects were further categorized according to their body type i.e. Endomorph, Mesomorph, Ectomorph with the method suggested by "Heath and Carter". The study was designed as pre-test and post-test random group design. The experimental Group received SAQ training while the control group did not receive any specific training. Experimental group received training for a period of 84 days. Measurement of variables of both the groups: control group and experimental group was taken for all the body types before (pre-test) and after (post-test) the experiment period of 12 weeks. Analysis of co-variance (ANCOVA) was used to determine the impact of SAQ training on the body types. Among endomorphs, the experimental group was observed to have better performance in speed, agility and quickness as compared to control groups. It can further be stated that the difference in the post test scores may be due to the training program induced. Among the mesomorphs, the experimental

group had better ability in speed, agility and quickness. In ectomorphs, the experimental group performed better in terms of speed, agility and quickness. Among all the categories of body types, it was the experimental group which was found to have performed better. It was concluded in the study that the training program had an effect on speed, agility and quickness of the subjects selected for the study.

**Horicka et al. (2014)** studied the difficulty of assorted understandings of the term "agility" among the context of team sports games. They stress the actual fact that the speed of movement is barely one in all the elements of the advanced motor ability known as agility. Supported the theoretical analysis, the researcher disbursed measurements of basic factors of speed skills and agility in 14-17 year old basketball, volleyball and football game players with a sample size of fifty six players. Statistical differences were determined within the level of agility take a look ated by Fitro agility test. There was no important correlation among the results of Fitro agility and Illinois were measured speed skills. The results advised that agility isn't merely one in all speed skills. Rather, besides normal reaction speed, acceleration, retardation in the midst of the change of direction of movement it includes conjointly sensory activity elements determined by advanced reaction to surprising, changeable stimuli occurring throughout a sport game. Significant differences were determined within level of reaction speed to varied stimuli between the players of assorted sport games. The researchers conjointly determined that there was no significant relationship was found between the periods of performance in agility with advanced reaction. The on top of mentioned facts show the dominance of perception within the character of movement action in game situations in sport games and its importance within the development of agility within the sport preparation. It was conjointly advised within the study that there's a necessity among the sporting community to data what agility involves, however its training ought to be imparted and what characteristics are used whereas assessing using agility.

**Milanovic et al. (2014)**, in his empirical study, geared toward determinant the results of a twelve week SAQ training program on speed and flexibility in young soccer players. 132 soccer players were every which way assigned to experimental batch. All samples were males taking part in at intervals the first Croatian Junior U-19 League

throughout the 2010-11 season. Goalkeepers weren't cafterned throughout this study thanks to potential variations in their morphological characteristics and motor ability. The experimental batch performed SAQ training whereas the control batch undertook straight-line sprint coaching matched for volume and period. No vital variations for all flexibility tests were found between experimental and control batch at baseline and when the training programs. The consequently SAQ training was found to be a good manner of up sprint time for minimum distances over five and 10m however not over 20m. These results indicated that SAQ training could also be effective improving for sprint performance for a few soccer players however additional research is needed to work out ideal training ways for up acceleration and flexibility in young soccer players.

**Nageswaran (2014)** examined the effect of SAQ training on Speed, Agility and Balance among inter collegiate athletes. The data included 24 male athletes from Rajah's College, Pudukkottai. The technique of selection was random sampling. The age of the samples selected was from 17 to 23 years. Two groups were formed from the samples selected for the study. SAQ training was given to Group I and Group II was used as control group. The experimental group was given SAQ training for alternative thrice a week up to 6 weeks. The independent variable was SAQ training and the dependent variables were speed, agility and balance. Measurement of speed was done by 50m, Agility was measured by shuttle run and balance was assessed by stork stand test. Pre and post-test randomized design was used as the experimental design. The data were collected from each sample before and after the period of training and statistically investigated using dependent 't' test and analysis of covariance (ANCOVA). It was observed that there was a significant improvement and significant difference existed due to the effect of SAQ training on speed, agility and balance among inter collegiate athletes when compared to control group. The study also inferred that in consonance with the previous studies related to the subject, SAQ training is a better method to evolve the speed, agility and balance among young athletes.

**Singh and Singh (2015)** analysed the effect of 12 weeks SAQ equipment training on certain physiological variables such as pulse rate, blood pressure, respiratory rate, etc.

among school athletes. The technique of random sampling was used for this purpose. The samples were obtained from Jawahar Navodaya Vidyalaya, Longowal, Sangrur, Punjab. The age group of the samples was 14-17 years. There were 30 samples in the group which were further divided into experimental group and control groups, each group consisting of 15 samples. The exercise was followed in progression of speed, agility and quickness exercise for 1 to 6 weeks and quickness, combination of agility, speed and quickness for 7 to 12 weeks. The “t” test was used to calculate the statistics in the study. It was observed that the SAQ training had a significant impact and there was no difference between pre-test and post-test results of the control group. The main conclusion of the study was that the experimental group had significant improvement due to the SAQ training.

**Trunic and Mladenovic (2015)** explained the significance of the development of SAQ skills for young cagers. The study also provides an overview of characteristics of training, main principles and methodological notes for speed, agility and quickness training. The tendencies of anthropological development of children are completely compatible with the goals of developing SAQ skills, which is proved by the overview of sensitive periods of development and principles which refer to the longterm programme of their implementation in the training technology. The significance of the development of these characteristics for young cagers has also been highlighted for young cagers. The main characteristics of the training of speed, agility and quickness has been given as an example of optimal training of young cagers. SAQ skills are very important for success in basketball. SAQ skills are determined at early age, and the most suitable phase for development are the years before puberty and the age following the phase of momentous growth and development. High level of these skills is achieved by long term, carefully planned training, while following methodological series of development and main principles of sports training. The main goal of fitness trainers of kids and young cagers is recognizing specific needs and application of each participant for SAQ development.

**Diswar et al. (2016)** statistically analysed the comparative effect of SAQ and circuit training program on selected physical variables of school level cagers. The sample enclosed thirty school level cagers aged between fourteen to seventeen years

chosen randomly from Simpkins school city U.P. The sample batch was divided in 3 batches. Batch-A type was given SAQ training, batch-B type was given circuit training and batch-C was thought to be the control batch. Post data was collected when 12 weeks of experimental period. Analysis of Variance (ANCOVA) was applied and post hoc mean difference was done by using (least sq. difference) LSD test. It had been terminated that SAQ program was considerably higher than circuit training program for speed and lightness whereas circuit training program was higher than SAQ training program for abdominal, arms & shoulder endurance being studied by the research worker. For explosive strength, no important distinction was found between each the training programs. The study is kind of helpful within the sense that it investigated the comparative result of 2 forms of training program on selected physical variables of school level cagers which might additional facilitate in structuring of training for cagers.

**Karthick et al. (2016)** investigated the impact of SAQ training on some physical fitness parameters and kicking ability of high school level male football players. The samples of 30 players for the study were selected from government higher secondary school, Thummanatty, The Nilgiris. The samples were randomly assigned to two equal groups with 15 players in each group. SAQ training was provided to group I while group II was used as control group. The physical fitness parameters selected for the study included speed (50 m) and agility (10 X4) kicking ability (Warner soccer test). After the initial test, SAQ training was given to the experimental groups for 3 days per week (Monday, Wednesday and Friday) days the period of twelve weeks. The control group was not be given special training except for the routine training. The statistical tool used for the study was “t” test to find the significance of the results of the study. The level used to derive the conclusions was 0.05 level of confidence. It was observed that speed, agility and kicking ability improved significantly due to impact of SAQ training. However, there was the limitation of diet, climate, life style status. It was also reiterated that SAQ training can be used to bring out desirable changes in speed, agility etc. of players. The result of the present study lend support to the previous findings of the investigation done by different researchers in the field of

sports. The study also suggested that SAQ training must be made an integral part of the training routine for players.

**Kumar and Prasad (2016)** investigated the impact of SAQ training verses sprint interval training on dribbling ability of men cagers using the sample of forty five male inter-collegiate level cagers from various colleges of Acharya Nagarjuna University, Andhra Pradesh. The age of the sample batch ranged from 18 years to 23 years. The sample batch was randomly assigned into three equal batches of 15 subjects each. Batch-I underwent SAQ training, batch-II went through sprint interval training and batch-III acted as control batch. The research design of the study was pre and post-test random batch design. The applied mathematics tool applied to derieve the results was the analysis of variance (ANCOVA) check. Additionally to the present, the Scheffe's test was applied as post hoc test proper hoc check to see the paired mean differences. The results of the study disclosed that due to the result of SAQ training and sprint interval training the actuation ability of the subjects was considerably improved. It absolutely was conjointly found that SAQ training is considerably higher than sprint interval training in up actuation ability of men cagers. supported the findings, it absolutely was any instructed within the study that without correct designing of the SAQ and sprint interval training, cagers can possibly be confronted with decrease in game performance throughout in-season amount. Coaches ought to build training a lot of specific for players in such the simplest way that the transfer of training effects to game potency is quicker.

**Singh (2016)** examined the impact of S.A.Q. drills on skills of volleyball players. 50 junior male volleyball players from Delhi state participating in junior & school national Championships were selected for the study. The independent variables for the study included speed, agility and quickness. Pre-test and post-test randomized batch design was used for the study. The data was collected pre, intermediate and (post) after twelve weeks of training. The statistical technique sued to analyze the results was Analysis of Covariance (ANCOVA). The results of the study have strongly supported the fact that SAQ drills programme improve the skills performance among the volleyball players of junior level. The rate of increase/improvement in the experimental batch in comparison to control group for junior level clearly suggested

that SAQ training was an important contributor towards increase/improvement in the performance of the players. The pre to post-test improvement for junior is eleven times higher. The researcher also suggested that if these skills are successfully combined and specialist SAQ equipment is utilized, it can result in creation of very good and trained players.

**Shane (2016)** examined the impact of an eight-week intervention program so as to produce a recommendation of the foremost preferred training program for young soccer players for rising sprint performance, agility and jumping parameters. Boys aged between 14-16 years old from a football game club in Jyvaskyla. Thirty three players in total took part within the study whereby data such as age, weight, height, circumference of the thigh and years of training were obtained. The various batches like a speed and agility batch, quickness batch, plyometric batch and control batch or batch were fashioned. Players were randomly allotted into every batch in keeping with their Pre-test results. The two experimental batches went through twice a week lasting 30-45 minutes each session. Players within the control batch continuing with ancient soccer training. The study was done on amateur young football game team and therefore the results indicated that plyometric and SAQ training is needed for boys aged 14-15 years old to keep up and improve maximum sprint speed over the course of an eight week training period. It absolutely was additionally discovered that solely 30-45minute session was needed to straight line speed and jumping within the horizontal plane. This frequency of training was additionally enough to keep up agility performance and vertical jump height. Basic plyometric and SAQ training is helpful to the young players whereby they are doing not have access to specialised training instrumentation. It absolutely was found within the study that plyometric, SAQ and ancient training are quite effective technique of training young football game players. The study more prompt that young football game groups that don't have the time or money resources to produce individual training, combining plyometric and SAQ training twice a week may be a excellent possibility.

**Singh and Singh (2017)** studied the effect of twelve weeks of SAQ drills training program on some physical variables of hockey players. The sample selected for the study included 200 junior hockey male players from the city of Amritsar district who

were participating in junior inter district, junior national and school national championship. The age group of samples between 17 to 19 years. The statistical technique used to analyze the data was Analysis of Co-Variance (ANCOVA). The results showed that the impact of SAQ drills training help to improve the selected physiological variables of hockey players. It was also observed that there is remarkable improvement in physiological variables of the experimental group after twelve weeks of training programme given to the players. The physiological variables which experienced improvement included vital capacity, resting pulse rate, pulmonary ventilation rate, etc. the authors also suggested that these types of trainings should be imparted top teachers well in time so that they can introduce these trainings to the young players during the initial years of conditioning which can go a long way in improvement in sports performance of these players.

**Azmi and Kusnanik (2018)** analyzed the impact of SAQ training program on improvement in speed, agility or acceleration. The sample of the study was twenty six football players that were divided into two groups. There have been thirteen players in every group. SAQ training was given to group one whereas group a two had typical training programs for a period of eight weeks. The study used the strategy of quantitative approach. Information regarding testing 30-meter sprint (speed), agility t-test, and run ten meters (acceleration) throughout the pre-test and post-test was collected for the aim of research. The techniques like paired sample t-test and independent t-test were used for the aim of statistical analysis. It had been determined that there was an apparent and memorable impact of speed, agility and quickness training program in improvement of speed, agility and acceleration. The analysis supported the actual fact that speed, agility and quickness training program will boost the speed, agility and acceleration of the football players.

### **STRENGTH TRAINING**

**Brar (1985)** created a comparative study of the result of circuit training and interval training on designated physiological mensuration or measurement and running performance of females over a period of twelve weeks. The scholar found that circuit training ways are notably effective in rising the speed and endurance of feminine or female student.

**Hisaeda (1996)** conducted a study to estimate the impact of 2 completely different modes of resistance training in feminine subjects. This study used 2 teams whereby one cluster underwent resistance training with low intensity and high volume training and therefore the alternative cluster participated in high intensity and low volume coaching. The training of the previous batch enclosed 4-5 sets of 1-20 RM with adequate rest between sets, whereas the coaching of the latter batch consisted of 8-9 sets of 4-6 RM with ninety seconds rest in between sets. In both batches, the changes of the iso kinetic strength were perceptibly high. It had been additionally determined that in the first section of resistance/ weight training, 2 completely different modes of resistance coaching have same impact on untrained females.

**Kraemer et al. (2000)** conducted a study to analyse the impact of volume of resistance exercise on the development of physical performance abilities in competitive, collegiate female tennis players. 24 lawn tennis players were matched for tennis ability and were at random placed into one of 3 batches. The primary batch was a no resistance exercise control batch. The second batch enclosed a periodized multiple-set resistance training batch and therefore the third batch enclosed a single-set circuit resistance training batch. It had been found that there was no vital changes in body mass were discovered in any batch throughout the period of training. However, there was a decrease in body fat mass within the periodized training batch after 4, 6 and 9 months of training. Another observation was that there was a significant increase in power output was observed after 9 months of training in the periodized training batch only.

**Mazzetti et al.(2000)** analysed and compared the changes in maximal strength, power, and muscular endurance after 12 weeks of periodized heavy resistance training directly supervised by a personal trainer (SUP) versus unsupervised training (UNSEP). 10 trained men were indiscriminately appointed to the SUP batch and eight were appointed to the UNSUP batch. Each batches performed identical linear periodized resistance/weight training programmes. Men training load per week were considerably bigger within the SUP batch than the UNSUP batch. Squat, bench press and peak power output enhance perceptibly after training in each the batches. Relative native muscular endurance didn't decrease in either batch.

**Lemmer et al. (2001)** compared the age and gender impact of strength training on Resting Metabolic Rate (RMR), Energy Expenditure of Physical Activity (EEPA), and body composition. RMR and EEPA were assessed before and when twenty four week of strength training in 10 young men (20-30 year), nine young ladies (20-30 year), eleven older men (65-75 year), and ten older women (65-75 year). It absolutely was found that after all were pooled along, absolute RMR considerably improved by 7%. Moreover, ST accumulated absolute RMR in each young and older subjects, with no vital interaction between the 2 age batches. EEPA and TEE measured with a Tritrac accelerometer device and Tee calculable by the Stanford Seven-Day Physical Activity Recall questionnaire didn't show any modification in response to strength training for any batch. It absolutely was terminated that changes in absolute and relative RMR in response to ST are suffering from gender however not age. The study additionally found that in distinction to previous studies, changes in body composition in response to strength training don't seem to be because of changes in physical activity outside of training.

**Millet et al. (2002)** analysed the effects of concurrent endurance and strength training on running economy and VO<sub>2</sub> kinetics. Fifteen trial athletes were taken as the subjects for the study. There were two types of training. The first was endurance-only training and the second one was endurance plus strength training. These trainings were given for 14 weeks. It was observed from the study that after the training period, maximal strength increased in endurance plus strength training but remained unchanged in only endurance batch. Hopping power decreased in the batch which only had endurance training. After training, economy ( $P < 0.05$ ) and hopping power ( $P < 0.001$ ) were higher in ES than in E. VO<sub>2</sub> (2max), leg hopping stiffness and the VO<sub>2</sub> (2) kinetics were not significantly difference affected by training either in ES or E. the study concluded the additional HWT led to improved maximal strength and running economy with no significant effects on the VO<sub>2</sub> (2) kinetics pattern in heavy exercise.

**Izquierdo et al. (2005)** determined the impact of a training period of 16 - weeks of resistance training alone, endurance coaching alone, or combined resistance and endurance coaching on variables like muscle mass, greatest strength and power of the leg and arm striated or extensor muscle muscles. The results indicated that low-

frequency combined training of the leg extensors in middle aged men led to a lower greatest leg strength development solely once prolonged coaching. However, it doesn't perpetually lead to the event of leg muscle power and vas fitness.

**Tricoli et al. (2005)** in his empirical study, compared the short-term effects of heavy resistance training. 32 young men were selected as subjects and divided into three batches. The three batches were WL batch, VJ batch and control batch. There were 12 subjects in WL and VJ batch respectively while in the control batch, there were 8 subjects. These thirty two men took part in an eight-week training study. Training volume was increased when four weeks. It absolutely was ascertained that each batches, WL and V J, increased C M J, however batches victimization the W L program increased over those victimization the V J program. On the contrary, the batch victimization the V J program increased its 1RM half - squat strength over the WL batch (47.8 and 43.7 % respectively). Solely the WL batch improved within the S J (9.5%). The results showed that there have been no vital changes within the control batch. The study created the reasoning that Olympic WL exercises made broader performance enhancements than V J exercises in physically active subjects.

**Jackson et al. (2007)** analyzed the implications of a resistance training modality on sport performance, twenty three trained club level cyclists were placed into high resistance/low repetition (H-Res), low resistance/high repetition (H-Rep), or cycling-only. The training program extended over a period of ten weeks. The same cycling plan was given to all 3 batches, however the H-Res and H-Rep batches additionally received resistance training. VO<sub>2</sub> values were measured to investigate economy. Maximum strength testing of four strength exercises was through with the H-Res and H-Rep batches. It absolutely was inferred that numerous factors like acute fatigue, strength, and aerobic gains from the cycling training, together with well-developed bases of strength and conditioning from previously received training, reduced variations in performance between batches in each strength gains and cycling performance.

**Langford et al. (2007)** compared the results of ten weeks of resistance training on bench press strength. The specificity was assessed by examination the ability to transfer strength gained from a kind of training that differed from the method of

testing. There have been forty nine men who participated as subjects within the study. The three batches were checked to search out whether or not differential training impacts occurred from pre- to post test scores on the BB, MB, LB, and peak force on the IB. The results of the study showed that all three training batches intimate significant improvement in strength throughout short term training on the MB, BB, and LB. These data additionally proof that improved strength after training on the MB, BB, and LB transfers to strength gains.

**Santos and Janeira (2008)** assessed the eventualities of a lower and upper-body resistance training program on explosive strength development in cagers. Twenty-five adolescent male athletes, aged fourteen to fifteen years old, were randomly appointed to an experimental batch and a control batch. The experimental batch include fifteen subjects whereas the control batch include ten subjects. The subjects were evaluated on the premise of baseline and after training for squat jump. The EG showed noticeable will increase all told the variables. On the contrary, the CG considerably declined in SJ, CMJ, and Abalakov test scores and significantly enhance within the results of MBT test. The results indicated that a ten-week in-season resistance training program with medium volume and intensity loads enhance vertical jump and MBT performances.

**Vissing et al. (2008)** conducted a study to compare the changes in varied physiological variables like changes in muscle strength, power, and morphology enclosed by conventional strength training vs. Plyometric training of equal time and energy needs. The subjects chosen for the study were young, untrained men performed twelve weeks of progressive conventional Resistance / strength training (C R T, n = 8) or Plyometric training (P T, n= 7). Tests before and after training include one-repetition most (1 RM) incline leg press, 3 RM knee extension, one RM knee flexion, counter movement jumping (CMJ), and flight incline leg press. Resonance imaging scanning was performed for the thigh, and a muscle diagnostic assay was sampled from the vast us lateral is muscle, before and after training. It was much greater than for CRT ( $p < 0.01$ ), which only increased P. Max during the ballistic leg press (4%) ( $p < 0.05$ ). Myosin heavy-chain IIX content decreased from 11% to 6%, with actually no difference between CRT and PT. Consequently, gross muscle size

was increased both by PT and C R T, while C R T seemed to increase only the muscle fibre C S A. Increase in maximum muscle strength was quite similar between batches; whereas muscle power increased almost exclusively from PT training.

**Dorgo et al. (2009)** investigated the effects of a manual resistance training (MRT) program on muscular strength and endurance and to compare these effects with those of identically structured weight resistance training (WRT) program. To do this, eighty four healthy college students were randomly assigned to either an MRT batch and engaged in a very fourteen-week training program. Every participant's performance was assessed before and at after when the 14-week training period. It absolutely was over that, the enhancements in muscular strength and muscular endurance when a fourteen-week MRT program with in the present study were like those made by a WRT program, and well-designed MRT exercises appear to be effective for rising muscular fitness.

**Aagaard et al.(2010)** in their study, analyzed the impact of concurrent strength and endurance training on adaptive changes in aerobic capacity, endurance performance, maximal muscle strength . It absolutely was found that the impact of coincidental strength and endurance training solely seldom affected the performance of superior endurance athletes. It absolutely was additionally found that strength training will result in increased long-run (>30 min) and short-run .The enhancement in endurance capacity was the result of training-included increases in the proportion of type IIA muscle fibers as well as gains in maximal muscles strength (MVC) and rapid force characteristics.

**Azeem and Ameer (2010)** analysed the impact of Weight Training (WT) on sprinting performance, flexibility and strength. The sample of the study include twenty students. A forty five min WT schedule twice every week for twelve weeks was administered. The check thought-about were strength (1 RM for all the WT components), 50m run and sit and reach. Speed is one in all the variables that is related to the fitness of the subjects. The study found that there was a important improvement in sprinting performance and suppleness improved from pre to post check state of affairs. High pull downs improved the strength of the rear muscle and also the analysis points towards it with from pre to post-test scenario affairs. The

results has disclosed that WT multiplied enhance and conjointly showed some increase in speed and flexibility.

**Trzaskoma et al. (2010)** compared the result of combined weight and pendulum training exercises with those isolated ones on muscle strength and vertical jump performance. The participants enclosed thirty eight men who were divided into four batches. These four batches performed completely different exercises combining strength and power training. These exercises cafterned weight training and pendulum swing exercises. Results of one repetition most (1RM) fully squat and squat jump with the weight, maximal force measured throughout countermovement jump (CMJ), and hip and knee flexor muscle and extensor muscle isometric strength were analyzed. Positive significantly increase altogether strength and power parameters were found after combined training was used. The study additionally advised that plyometric pendulum/apparatus swing training combined with traditional training is an alternate, effective methodology to extend muscle strength and power among sportsmen.

**Turbanski and Schmidtbleicher (2010)** analysed the result of heavy resistance / strength training on strength and power among wheel chair athletes. Fort the aim of the study, sixteen male subjects were selected who participated during this study-8 with SCI and eight healthy control subjects. The 8-weeks program cafterned heavy-resistance exercise performed double per week with ten to twelve repetitions in five sets. Subjects' performances were tested in static and in dynamic conditions relating to many strength and power variables. Additional a lot of, the investigators evaluated 10m sprinting performance among wheel chair athletes. There wasn't a lot of distinction among the results for the wheel chair athletes and control batch. Moreover, wheelchair athletes showed an inclination to benefit a lot of from the strength training performed within the gift study. The results showed direct impact of strength training. The study also suggested that significant resistance training ought to be of utmost importance in wheelchair sports.

**Karavirta et al. (2011)** examined the possible interference of combined strength and endurance training on neuromuscular performance and skeletal muscle hypertrophy. The sample included untrained forty to sixty seven year-old men. The variables

measured were peak strength and muscle activation, concentric power, aerobic capability and muscle fiber size and distribution. The researcher measured them before and after a period of twenty one week training. The study conjointly took into thought that combined training might create an interference with the muscle hypertrophy in aging men. It was found from the results that each endurance and strength training have many positive impacts on aging muscle. They conjointly absolutely have an effect on the bodily performance of old and older adults. The study, in consonance with previous study related to the subject, observed that the fusion of these two distinct training patterns may interfere with optimal neuromuscular adaptation, depending on the intensity of the training, its frequency and duration. It was also found that combined strength and endurance training for 21 weeks in 40–67-year-old men, who were previously untrained, improves strength performance to the same level as strength training alone when both strength and endurance training patterns are conducted twice a week. It was also contended that drafting combined training programs for middle-aged and older adults to prevent or delay the age-related loss of skeletal muscle mass, the possible interruption of muscular adaptation, especially in type II fibers, should be considered.

**Lo et al. (2011)** conducted a study to research the shifts within the physiological composition, body-size, muscle mass, and  $\dot{V}O_{2\max}$  after 24 weeks of resistance or endurance training and detraining in young men. Thirty healthy college students ( $20.4 \pm 1.36$  years) participated in the study. There were ten subjects in the resistance batch, ten in endurance training batch and ten more in the control batch. The training program was comprised running or weight-resistance exercises exactly for sessions thrice a weeks under the supervision &  $\dot{V}O_{2\max}$ , higher and lower body strength (UBS, LBS), body fat, lean body mass, and body circumferences were weighed at baseline and also after training and detraining. Right after the training period, the exercise batches exhibited significant in  $\dot{V}O_{2\max}$  and LBS ( $p < 0.05$ ). The UBS, lean mass (LM), and body size of arm and calf were considerably bigger within the RTG than within the alternative two batches ( $p < 0.05$ ). Additionally, the strength and LM of the RTG were still more than the baseline values after 24 weeks of detraining ( $p < 0.05$ ). Concluding the study was the

fact that the endurance and resistance training resulted in training-specific developments in bodily performance, body composition, and size of the arms of the subjects and the RTG sustained the gains in strength and LM for longer periods after training came to an end, in comparison to the endurance training batch.

**Guigan et al. (2012)** examined if strength training research really helps in improving athletic performance. The study is mainly analytical in nature and presents an overview of importance of strength training programmes for improvement of performance of athletes. The researcher infers that strength training is used to increase under-lying strength and power qualities in elite athletes in an attempt to increase athletic performance. It was also observed that strength training can increase strength, power, vertical jump, speed and acceleration in a range of different sports. Explosive strength training increase maximal sprinting speed and vertical jumping in soccer players. Strength training can also enhance other more specific motor abilities such as agility. It was also observed in the study that there is a positive transfer of specific strength training on sport-specific skills like kicking velocity and bat velocity in baseball. The researcher concluded with the suggestion that the strength training programs should be designed to contribute to overall impact of strength of the athletes and the programs should be altered to cater to the differential needs of the athletes.

**Vino (2012)** The researcher made an attempt to find out the effects of plyometric training, weight training and the combination of plyometric and weight training on the performance of volleyball players. 60 male college volleyball players were selected as subjects using random sampling technique at from Kanyakumari District, Tamilnadu. Four batches were made out of the selected subjects with 15 subjects in each batch. Batch I received plyometric training, batch II got weight training whereas combination of plyometric and weight training were given to the third batch for three alternate days in a week for a period of twelve weeks. Batch IV was taken as control batch who did not receive any other training except their regular routine. The age of the subjects was from 17 to 22 years. The variables used for the study were speed, explosive power, muscular strength, agility, resting heart rate, breath holding time, etc. Various statistical techniques such as the dependent t-test, the univariate analysis of covariance (one-way ANCOVA), and the post hoc pair wise comparison using the

Scheffe's test analysis were used for statistical analysis and derivation of results. It was perceived in the study that there would be a significant improvement on selected physical and physiological variables due to the significant impact of plyometric training, weight training and combination of training programmes. The results showed that these trainings did have a noticeable impact on the performance of the players. It was further observed that there was an observable and significant differences on selected physical and physiological parameter among the plyometric training, weight training and combination of training programmes and control batches.

**Jain (2013)** The researcher analyzed the combined effect of the plyometric training, resistance training and their combined effect on the sports performance of players. National level female cagers on 60 students were selected as subjects from various Government Senior Secondary schools using random sampling technique. Equal numbers of subjects were assigned randomly to four groups, of fifteen subjects each. The experimental treatments were also assigned randomly to the 3 groups and 1 group served as the control. Three different types of training programmes for the development of fitness level and performance of female cagers were given to three different experimental groups. Group-I received plyometric training, group-II received resistance training, and combination of both (plyometric and Resistance Training) to group-III. A proper warming-up extending from 15-20 minutes duration was given before training sessions. It was given to the experimental groups. The control group wasn't allowed to participate in any of the coaching programme except in their daily routine observe. The subsequent variables were hand-picked for the study: flexibility, strength, speed, agility, cardio-vascular fitness, etc. F-test and ANCOVA were accustomed analyze the statistical results. The distinction between the initial and final results were computed to investigate if there was any vital distinction within the performance of the players.

It was observed that the combined effects of the training programs were much stronger in influencing the performance of the players as compared to the individual impacts of the said trainings. Further, the beneficial effects were more observed during the first few weeks of the training. Therefore it can be said that combination

training programs and well-structured trainings can go a long way in helping improve the performance of the players.

**Schoenfeld et al. (2015)** studied the comparative result of low vs high-load resistance training (RT) on muscular adaptations. The subject consisted of eighteen young men who were matched in line with baseline strength. Eight to twelve repetitions were done per set per exercise with a sample size of nine in every batch. The subjects in each batches performed three sets of seven completely different exercises representing all major muscles in every session. Training was given three times per week on non-consecutive days, for eight weeks. It absolutely was discovered that both HL and LL conditions made vital increase in thickness of the elbow flexors, elbow extensors. There have been increase in back squat strength (19.6 vs. 8.8%, respectively). Upper body muscle endurance showed exceptional improvement. The findings of the results indicated that each HL and LL training to failure can produce significant increase in muscle hypertrophy among well-trained young men. HL Training was found to be superior for increasing strength adaptations.

**Hammer et al. (2018)** investigated the maximal strength and jump performance eventualities of heavy squat training on a low-amplitude vibration platform. A complete of nineteen recreationally resistance-trained college-aged men were trained over a period of six weeks. The subjects were randomly appointed to training batches. Ten subjects performed standard back squats on the ground whereas a batch of nine subjects performed back squats. There have been twelve sessions of supervised training. Once the intervention, each batches showed a observable improvement in 1RM squat strength however there was no vital distinction between the batches. The study inferred that squats performed with full body vibration (WBV) weren't superior to conventional squats with relevance maximal strength and jump performance results. It appears that there was no additional result of superimposed WBV training on strength except that caused by strength training specifically. This study can be helpful for strength conditioning professionals and athletes.

## CONCLUSION

Training stimulates physical and physiological changes in the majority systems of the body. Training usually structurally exposes the chosen physiological systems to intensify the work or performance by effecting the motor fitness and skills for a particular sport. Thus many different training programmes are used by coaches from time to time to enhance the ability of players like SAQ training, Strength training, Circuit training, Plyometric training and many more combinations of training programmes. While reviewing the literature in this regard many studies were encountered signifying importance of different training programmes for enhancing performance of players. Many researchers and publishers had tried to find out one such tailored training programme for physiological well-being and motor fitness of players to sharpen their skills Like Polman et al. (2004), Bllomfield et al. (2007), Mehroetra et al. (2011), Vino (2012), Bujjibabu and Johnson (2012), Milanovic et al. (2013), Mitra (2012), Pathak (2013), Schoenfeld et al. (2015), and Hammer et al. (2018).

Each sport activity has its own requirements related to physiological, motor fitness and skill performance variables. The present study has selected basketball players to identify the effect of various training programmes. Keeping in mind the methodologies adopted in the above studies, the methodology followed for the present study was chosen and presented in the next chapter.

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