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## Chapter – 1

**INTRODUCTION**
1.1. Physical Fitness

Physical fitness is being accepted as one of the vital objectives of physical education. A nation’s true wealth lies not in its land and waters, not in its forest and mines, not in its flocks and herds. Actually it lies in its healthy and happy men, women and children and the energy and initiative and moral fitness of its people. In fact physical fitness is the ability of a person to live a full and balanced existence.

The adaptive capacity of the Individual to the rigors of work is determined by his physical fitness [Riedman, 1950]. Physical fitness has been defined as the ability to carry out daily tasks with vigour and alertness, without undue fatigue, and with ample energy to enjoy leisure time pursuits and to meet unusual situations and unforeseen emergencies. It is something more than "not being sick" or merely "being well". Also it is different from resistance to or immunity from disease. It is something else. In fact it is a positive quality, extending on a scale from death to abundant life.

All living individuals have some degree of physical fitness which varies considerably in different people and in the same person at different times [Clarke and David, 1978]. Physical fitness is not a fitness of one kind. It is the ability of each person to live most effectively with his potential in all walks of his life. It includes adequate degree of health, posture, physique, proper functioning of vital organs, nutrition, and good health habits along with an adequate amount of endurance, strength, stamina, and flexibility [Riedman, 1950].
1.2. Facts of Physical Fitness

The following facts substantiate the real concept of physical fitness

- Physical fitness is a part of total fitness
- Physical fitness consists of many components each of which is specific in nature.
- The Physical fitness or motor fitness aspects are same.
- Physical fitness depends upon the individual.
- Physical fitness is the basis for dynamic and creative activity.
- Physical fitness is one of the most important keys to health.
- Physical fitness can be improved by physical activity and exercise.

The relationship between the soundness of the body and the activity of the mind is subtle and complex. In this sense the following factors mainly considered should be inevitable for living:

- Every individual possesses enough physical fitness to meet the needs of his occupation and daily living.
- Every individual possesses physical fitness to be capable of meeting emergency situation.
- Individual should have enough physical fitness to enjoy leisure time activities.

Its Hoary Tradition

Fitness has always been a great concern of mankind. Physical fitness from pre-historic period to the present day has been equated with survival and power. The earliest human beings were dependent mainly on their own individual strength, vigour, and
vitality for survival. According to Darwin’s “theory of survival of the fittest” only the fittest can survive. For existence they had to acquire basic skills such as agility, balance, strength and endurance. Their physical activity was related first to survival activity. They had to run in search of food, clothing, shelter and protection from a hostile environment. 

[Harold and Janie, 1988] They had to prepare themselves to fight with the animals and other enemies.

From time immemorial, the most celebrated countries over the globe which have created glorious past and famous civilizations of Greeks, Spartan, Athenians, Romans have bestowed paramount importance to the concept of physical fitness of the human body.[John and Ann, 1969] The great rulers and citizens of the olden times were quite aware of the fact that physically fit subjects constituted not only a fit country but a healthy society too.

It was the order of those days that physically fit man had survived in the life struggle and comparatively a weaker man could not succeed in his attempts to establish himself triumphantly. The old saying 'Fit or Perish' was present in Sparta and Athens - during the Golden Era of Greek history and again in the early centuries of the Roman Empire. [Barrow and Brown, 1988].

The world's renowned thinkers have emphasized the importance of physical fitness in human beings to ensure a productive and meaningful life. It is from Memorabilia of Xenophon, we come to know of Socrates emphasis on the necessity of physical fitness and possession of a robust physique among Greek citizens. "No citizen has any right to
be an amateur in the matter of physical training; it is a part of his profession as a citizen to keep himself in good condition, ready to serve his State at a moment's notice”[Thirunarayanan and Hariharasharma, 1985]. It is evident that by “good condition” he means only the “good physical fitness”.

Plato, the disciple of Socrates and a great philosopher and also twice a winner at Isthmian games in his youth, observes in his "Republic", gymnastics as well as music should receive careful attention in childhood and continue throughout life. He also emphasized the importance of physical fitness for both men and women. According to Plato, physical fitness is not a one time achievement. The fitness should be developed in the childhood and maintained throughout the life. As gymnastics develops the flexibility of our body it is a very nice tool to develop physical fitness. One can attain maximum physical fitness through gymnastics. So Plato gave importance to gymnastics.

Aristotle stresses that body and mind are closely interrelated and interdependent. Further he opines that education of the body must precede the intellect. Before developing knowledge of any kind one should develop physical fitness. The fitness is not synonymous with health. It plays an essential role in all aspects of health because they are inextricably related. Good health provides a solid foundation on which fitness rests and at the same time fitness provides one of the most important keys to health-living one’s life to the fullest. Freedom from disease, organic development, efficient movement, alertness of mind, and emotional adjustment provide the framework of fitness. It has been often said that fitness adds “Life to years and Years to life”.
A good state of fitness means that all organs of the body are working efficiently and synchronized by. We may call it as health. The important of the proverbs, “health is wealth”, “if health is lost, everything is lost”, is realized more in its absence than by its presence. The importance of physical fitness is more than money and material comforts one should opt for.. Happiness is intimately concerned more with good physical and moral fitness than other external factors.

1.3. Physical Fitness in Ancient India

In ancient Indian mythology, Yoga is termed as an instrument to develop fitness. The Hindu Monks considered Yoga as a tool to develop physical fitness. They considered yoga, as science and give importance to develop various types of yoga. Yoga not only helps us to develop our health, it develops our mind also. Ancient Indians adopted yoga as a medicine. Modern man is a victim of stress and stress related disorders, which totally affect his life. Yoga is a good medicine for such type of disorders.

Yoga is an ancient form of relaxation and exercise that has many health benefits lowering cholesterol and controlling sugar in the blood. Yogis, those who practice yoga regularly have good physical fitness. We hear of yogis living for a long period. In his book “Autobiography of a Yogi”, Yogananda speaks of, TrailangaSamy who was reputed to over 300 years old and Sankari Mai Jiew, who was born in 1826 was still alive in 1946. Maharishi RaghuvaChariya lived upto the age of 115 and Dvraha baba was believed to have lived to over 250 years. Not only they had a long life, they maintained
their physical fitness throughout their life. By analyzing these factors we conclude that yoga, the Sanskrit word for “Union”, aims at synchronising both body and mental fitness.

The profound tradition of physical fitness in India could be traced back to thousands of years. It has been closely associated with the religious practices, traditions and culture of India. The then Indian Physical Education was nothing but contributing to physical fitness. The physical fitness programme was in the form of physical activities like Yogasanas, Pranayama, Dands, Baithaks, Malkhamb, Lezium, Lathi and so forth and the games like Kabaddi, Kho-kho and Atyapatya have been in vogue from time immemorial, but the names of the inventor and the dates of their origin are not clearly known. Yet we are aware of the fact that a scientific system of physical fitness programme was in existence in India and it was practiced by the people from time of yore. These physical fitness programmes were organised and practiced in Parnashalas, Ashramas, Hermitages, and the Temples. The preceptors were the Ustads. The age-old Vedas have also sounded the strength as one of the components of the physical fitness programme. This could be assessed in the following words "BalanaVaiPrithiviTishtati, BalanUpaswa" (The world stands protected by strength, worship strength) [Thirunarayanan and Hariharasarma, 1985].

Medical authorities of ancient India, such as Charaka and Susruta, recommended physical exercise (Vyayam), Oil bath, and massage for maintaining and restoring health. Susruta defined Vyayam as movements of the body that produced sufficiently vigorous circulation of the blood and sound respiration to delay the onset of fatigue in an
individual. Charaka recommended various exercises to ward off disease, reduce weight, and activate digestion, present a pleasing appearance, and delay the encroachment of old age.

Dance requires a great deal of physical fitness. It has a long and systematic history in India and is intimately associated with religion. The bronze figure of a dancing girl found in the ancient city of Mohenjo-Daro proves the antiquity of the art, and the early literature reveals the people's love for dancing and an important role it played in their religion. In fact, Shiva, one of the trinity of Hindu Gods, was known as 'the Lord of Dance'.

The development of physical fitness and motor skills was incorporated in the vocational aims of certain groups of people especially that of the Kshatriyas or military caste. Dancing girls were also trained to give expression to religious concepts and to provide recreation for spectators. [Deobold and Bruce, 1971]

The great epics the 'Ramayana' and 'Mahabharata' have considered physical fitness as an important factor in all warfare. It was promoted through participation of Indigenous system of physical activities. [Thirunarayanan and Hariharasarma, 1985]. The great Nalanda and Takshasila universities prominent in ancient and medieval India had physical fitness programmes for 10,000 children at one time in the form of indigenous activities and gymnastics of Indian origin.
1.4. Physical Fitness in Pre-independent India

History of mankind is full of evidences that physical fitness has always been an important and essential objective of various civilizations and governments. The English historian, Arnold Toynbee wrote that out of the twenty one great civilizations of the past, nineteen of them failed to survive because of the physical and moral decay from within [Barrow and Brown, 1988].

John Locke [Harrison and David, 1978] has also affirmed, "A sound mind in a sound body", is a short but full description of a happy state in the world. He who has these two has a little more to wish for. The rewards of a rich and full life are closely related to physical capacity of the man.

People throughout the ages had a staunch belief that a nation's status, standard and destiny were to be decided not by the numerical strength of the people but by the 'Fit People'. Rudyard Kipling [Barrow and Brown, 1988] has aptly expressed:

“Nations have passed away and left no traces,
And History gives the naked cause of it,
One single, simple reason in all cases,
They fell because their people were not fit”.

The responsibility of education in the year 1833 was in the hands of British rulers, and hence they never paid any attention to the inclusion of physical fitness system in the school education programme.
The war of Indian Independence of 1857 had suppressed the physical fitness programme of indigenous physical activities, and it was replaced by Westernized type because the whole country was under the control of the whites. [Thirunarayanan and Hariharasarma, 1985].

In 1870, education was made a state subject retaining the supervisory power at the centre. Even then, physical fitness programme was given no place in the school programmes [Kamalesh and Sangaral, 1991].

The alien rulers had the fascination of promoting Western games in schools and colleges and thus degraded the indigenous physical activities. To give more impetus, Britain had introduced in India, the Malaren’s system of gymnastics adopted from the German system, Swedish drill, military drill as adapted by Ling system, Marching and rhythmic exercises adapted from the Danish system and the modern British games like Football, Cricket, Hockey, and so forth., to aim at fulfilling the desired components of physical fitness [Thirunarayanan and Hariharasarma, 1985].

The outstanding development of physical fitness programme in pre-independence days goes to YMCA College of Physical Education founded in 1920 by Mr. Harry Crow Buck at Madras. The network of physical fitness components such as strength, endurance, flexibility, speed, agility and so forth, were found a place in the games of Volleyball and Basketball introduced in India with the American influence through the YMCA. Afterwards several institutions, namely, Government College of Physical Education, Hyderabad (1931), Christian College of Physical Education, Lucknow
(1932), Training Institute of Physical Education, Kandivali (Bombay) (1938) and so forth sprang up basically to serve the cause of the physical fitness programme in India.

The Olympic movement in India resorted to encourage participation in high level competition and also to create a sense of participation in games and sports among mass in general. It was in the year 1920 six competitors were sent for the first time to represent India in Athletics and wrestling in the world Olympic Games held at Antwerp (Belgium) after having made them physically fit and also fit in the skills for the high level performance.

With a view to feed players and athletes for the high level competitions, several physical fitness training programmes were launched in order to develop their strength, endurance, and agility.

1.5. Physical Fitness in Post-independent India

The impact of World War II made to develop physical fitness in the youth of the nation. The need for the national programmes of physical fitness was felt by the then administrators of India because young people were not in sound physical condition for selective services and professional preparation programmes. Physical fitness programme was very much necessitated for rehabilitating the war victims and it was also used in the educational and training institutions in the form of physical therapy, occupational therapy and physical re-training.

After attainment of independence, utmost importance was given by the Indian Government for the promotion of physical fitness programmes to keep the citizens fit,
both in body and mind for the national security, individual welfare and efficiency in production. The Government launched various measures for the promotion of physical fitness among youths and improved performance of the Indian sportsmen at International competitions. Physical fitness programmes were started with the establishment of Rajkumari Sports Coaching Schemes (1953), and the All India Council of Sports (1954) and National Discipline Scheme (1954) [Thirunarayanan and Hariharasarma, 1985].

Many programmes with an idea of improving the physical fitness at the grass root level (that is, at the school level) were launched. Each student was given an opportunity to assess his own physical fitness level as to develop skill and understanding that will enable him to enjoy productive presence and more meaningful existence in the school. The physical fitness programmes in schools were initially placed at the hands of retired army personnel. There were no special periods allotted for physical fitness; it was expected that children would develop a certain amount of physical fitness through participation in some physical activities.

The Central Advisory Board of Physical Education has made further progress with the existing programmes on scientific lines by introducing specific schemes like National Discipline Scheme, National Physical Efficiency Drive, Auxiliary Cadet Corps, Youth Services Camps, Scouts and Guides, National Cadet Corps and the like [Thirunarayanan and Hariharasarma, 1985].

A National Plan of Physical Education and Recreation sponsored by the Ministry of Education finalized in 1956 suggested norms for physical efficiency tests.
One of the programmes of National Physical Efficiency Drive as specified above, was sponsored from the year 1959-60 with a specific purpose to create consciousness and enthusiasm among the people of our country for physical fitness and to stimulate their interest for physical welfare, which would help them to attain a better healthful living and in turn, increase the efficiency of work and result in a prosperous life. The factors which normally contribute to the physical efficiency of an individual is nothing but physical fitness components namely strength, speed, agility and endurance. To assess these components of fitness, batteries of tests in certain physical performances were framed. These were known as "Physical Efficiency Tests". These tests (100 metres run, 800 metres run, Long Jump, High jump, and Shot-put) were based on certain standards and homogeneity to the age group and sex. There were three distinct standards viz., 1. One star standard, 2. Two star standard and 3. Three star standard [Kamalesh and Sangaral, 1991].

National level awards were also given to the participants after they qualify for the requisite battery of tests in their own age group.

In 1959, the tests were conducted in 10 States and Union Territories at 269 centres. The number of participants was 77,109, out of which 42,357 people received merit certificates and medals. In 1968-69 the tests were administered In 12 States and 10 Union territories at 5,500 centres and 10,50,000 people took part. Out of which 4,10,000 people were qualified for merit certificates and medals, 12 people won national awards. To make it more appropriate and specific, the nomenclature of National Physical Efficiency Drive had been changed as National Physical Fitness Scheme. This scheme
was in operation for some years. While administering the batteries of tests under this scheme, some difficulties were experienced such as (i) technical events involving considerable training which were to be given in mastering over the performance and (ii) over-emphasis of neuromuscular skills. Besides, there were other important factors like loose organization, disinterestedness on the part of the conductors, and bureaucratic mismanagement in the matter of awarding prizes and medals. Therefore the National Physical Efficiency Drive Scheme became gradually weak and extinct [Kamalesh and Sangaral, 1991].

Education from the 'State list' was brought under 'concurrent list' by the 42nd amendment to the Constitution of India in the year 1976 [Indian Constitution, 1976]. The role of education has become vital instrument on the part of the State and Union Governments. The Union Territory of Pondicherry, being a centrally administrative state, closely follows the central government's direction. The National Physical Fitness Scheme had become a failure because of the reasons as attributed "SUPRA", not only at the centre but also in the State and Union Territory. Therefore, the need for improving physical fitness and raising the performance standard in various games and sports had been considered very imperative. In order to assess the physical fitness of individuals, there was a need to establish norms on the basis of the standard test batteries. In this direction, a significant step has been taken by this research scholar to establish norms and thereby to assess the physical fitness of school-going children.
Norms referred as ‘standard’ is based on statistical procedures which are developed to judge an individual’s performance in relation to others in the same age group, sex and at particular ability level.

Therefore norms of physical fitness are quite necessary in order to interpret scientifically the test scores, results and to evolve a standard procedure.

The AAHPER (American Alliance for Health, Physical Education and Recreation) youth fitness test battery is very popular in this region because of its comprehensiveness, simplicity, easy accessibility, and availability of the most of the physical fitness components. These components are strength, endurance, agility speed, power, and cardiovascular endurance. The problem for investigation in this test battery is undertaken by the research scholar with a view to establish valid and reliable physical fitness norms for elementary school children of Virudhunagar District.

African Journal for Physical, Health Education. Recreation and Dance (AJPHERD) is very popular international journal among the world wide publications. It has published so many research studies and research articles in sports, physical education, science, health etc. A large number of test batteries are introduced with simplicity and easy accessibility.

Topend sports an Australian website provides a wide range of information about Sports, Science, Fitness and Nutrition. It also provides more than 300 standardised tests to the top level sportsmen, coaches, professionals Research scholars and also for the individuals to test themselves.
Considering all the three Standardised tests, journals, and websites the present research study is designed and the test variables have been selected for the construction of norms for the elementary school children of Virudhunagar district, Tamil Nadu by the research scholar.

1.6. **Statement of the Problem**

At some periods of human history and in some premature society, physical fitness was a necessity for getting livelihood and even to remain alive. The Physical fitness is to be desired, because life cannot be full, pleasant or better balanced without it. A boy or a girl enters the period of youth ranging from 13 to 16 years, with a good awareness of physical fitness could definitely lead a resourceful and purposeful life.

For the past 25 years Virudhunagar District is leading in education both at the secondary and higher secondary levels whereas they do not have any fitness program in the district. In order to know their present fitness performance and to develop the children’s physical fitness the researcher initiated this study. This is the first study of this kind in the Virudhunagar district.

The study aims to analyze the children’s fitness under five motor fitness components. It also aims to fix physical fitness norms for the Virudhunagar District elementary school children, through which they can know their own fitness and to develop their performance. Further it aims at comparing the level of fitness of the children studying in the rural and urban elementary schools of the district.
1.7 Limitations:

The following factors were the limitations of the study because the researcher could not have any control over them:

i. The study was conducted on samples drawn from different populations in different places. So the motivation level of the subjects at the time of testing was not controlled.

ii. No effort was put into find out the effect of environmental changes of their schools and residents.

iii. Though the subjects were motivated verbally, no attempt was made to differentiate their motivation level during testing period.

iv. Since the subjects were non-hostellers, the investigator did not take any effort to control and assess the quality and the quantity of food taken by each individual.

v. The quantum of physical exertion, life style and physiological stress and other factors that affect the metabolic functions not accounted were also considered as limitations.

vi. Previous physical training in sports and games were not taken into consideration.

1.8 Delimitations

The study was delimited to the following factors:
i. The subjects of the study were confined to 58 elementary schools’ children randomly.

ii. The subjects include both boys and girls.

iii. The schools were selected from five Educational districts of Virudhunagar district, namely, Aruppukotai, Virudhunagar, Sattur, Srivilliputtur and Rajapalayam.

iv. The age of the subjects were ranged between 9 and 10 years only. That is, the children studying in fourth and fifth standards.

v. The data were collected as soon as the verbal motivation and instructions given to the children.

1.9 Significance of the Study

Evaluation is an essential aspect of any educational venture and it is true in the case of physical education also. To determine the effectiveness of any physical activity, it is essential to evolve a standard procedure to measure the achievement level. No efforts so far have been made in this area of study to formulate scientific evaluation procedures. For any evaluation procedure, where the performance can be obtained in terms of numerical scores, it is necessary that a standard scale be available to interpret, without which the scores may not convey much meaning. The present study, therefore, will be of a great significance as it will provide physical education teachers and coaches the norms to grade their children on the basis of their Performances in the physical fitness tests. It will also help the children to know their own level of achievement in relation to the
group, thus to motivate the children, to raise themselves to higher performance levels in comparison with their counterparts.

Physical education teachers in various schools of the Virudhunagar District have been entrusted with the responsibility of looking after the development of youth. During their growth and development period, it is essential to know their physical fitness status before giving any physical education program to them. This study would provide norms to determine the fitness status of the children and help the physical education teachers to plan physical education program accordingly.

No two individuals are alike. Individual differences make every physical education class a heterogeneous group. Hence, no one program of physical education can be ideal for all. Unless the strength and weakness of the individuals are known to the teachers, with the availability of norms, the coaches and physical education teachers in schools cannot determine the fitness status of the children and know the exact needs of each individual. Thus, a norm serves the purpose of a parameter to indicate the state of affairs with respect to physical fitness of the children. The present study will be significant in the following ways:

1. The present study enables to estimate the present physical fitness status for the elementary school children of Virdhunagar District.
2. The computed physical fitness norms serve as a guide for the other schools to assess then physical fitness status.
3. On the basis of the results of this study, proper physical education program can be planned effectively for the elementary school children.
4. The study provides an opportunity to physical education teachers and coaches, to spot-out the latent talents of the children and to select potential boys for different sports and games.

5. This study is more useful in planning our educational curriculum.

6. Through this study, pupil can be encouraged to participate in physical fitness program.

7. The study was delimited to the elementary school children studying from 4\textsuperscript{th} and 5\textsuperscript{th} standard in Virdhunagar district only and they were of the age group from 9 to 10 years.

8. The study was comprised of 5034 children (both rural and urban) randomly selected belonging to fifty eight elementary schools of Virdhunagar District.

9. AAHPERD Youth Fitness Test has been used as a tool to measure the physical fitness variables.

\textbf{1.10 Definition and Explanation of the Terms}

\textbf{1.10.1 Norms}

According to Chambers Dictionary \textbf{[Kirkpatrick, 1983]}, Norm is “an authoritative standard”. Norms of physical fitness are essential for formulation, control and assessment of training of sportsmen. The norms serve the following purpose:

1. Determination of the level of various motor abilities.

2. Determination of the effectiveness of various means and methods of training.
3. Selection of talents.

According to Barrow and McGee 1979, a norm is a scale that permits conversion from a raw score to a score capable of comparisons and interpretation.

Phillips and Hornak 1979, define Norms represent the achievement level of a particular group to which obtained scores can be compared.

"A Norm as the term is used in relation to test scores is the average of typical test scores (or other measure) for members of a specific group. Norms are often presented in tables giving the typical score values for a series of different homogeneous groups in a given grade or children of a given age. "Norms are standard point of differences to provide basis for judgment or for the determination of relations [Ebel, 1966]."

1.10.2 Physical Fitness

Physical fitness has been defined "as the development and maintenance of a sound physique and a sound functioning of organs, to the end that the individual realizes In an optimum measure h1s capacity for physical activity as well as for mental accomplishment unhampered by physical drains or by a body lacking In physical strength and vitality" [Riedman, 1950].

MathewsDonald, 1973 defines physical fitness as the capacity of an individual to perform given physical takes involving muscular effort.

William, 1970 defines physical fitness as “the capacity of an individual to perform physical work.”
In the words of Willgoose 1968, Physical fitness is “The capacity for an activity which must be enough to perform the given task.”

According to Hubert Dhanaraj 1968, “Physical fitness refers to the ability of the body to tolerate stress in all its kinds and maintenance manifestations.”

1.10.3 Speed

Barrow and McGee 1979, defined speed as the capacity of individual to perform successive movements of the same pattern at a fast rate.

Johnson and Nelson 1985, defined speed as the rate at which a person can propel his body, or parts of his body through space.

Speed is the ability to move from one place to another in the shortest possible time. It is primarily innate, yet it can be improved through practice by techniques and movement efficiency.

1.10.4 Power

Barrow and McGee 1979, defined power as the capacity of the individual to bring into play maximum muscle contraction at the fastest rate of speed. Power is in explosive action and it is equal to the product of force times velocity, where force is to do with muscle strength and velocity with the speed with which strength is used in motor performance.

According to Bosco and Gustafson 1983, Power is “A function of force and time (Power = Work / Time) and is defined as the rate of performing work (Work = Force x
distance). Since work is the product of force and distance over which the force is applied, power is that product divided by the time during which the force is applied.

According to Mathews 1973, one’s ability to get one’s body mass moving in the shortest period of time is a measure of power. The physiologists refer to such events as being anaerobic (without oxygen) i.e., they are performed in such a short period of time that Oxygen is not required in producing the necessary energy.

Power is the combination of strength with explosiveness (speed); maximum muscular force released at maximum speed. Power is a fundamental factor in jumping, throwing, kicking and striking. Power is improved through increase in strength and practice.

1.10.5 Strength

According to Barrow and McGee 1979, Strength is the capacity of the whole body or of any of its parts to exert force.

According to Mathews 1973, Muscular strength is the force that a muscle or group of muscles can exert against a resistance in one maximum effort.

According to Hockey 1973, strength may be defined as "The force, a muscle can exert against a resistance in one maximal effort". It is measured in units of pounds or kilograms.

1.10.6 Co-ordination

Coordination is the ability to move two or more body parts under control, smoothly and efficiently. Children have a better sense of balance and coordination due to
their body size and lower centre of gravity and have the ability to learn complicated movements/skills like those required by a gymnast.

All sports require the coordination of eyes, hands and/or feet to get connected with an implement or a ball. Racket sports (e.g. tennis and squash) require the coordination of hand, eyes and racket to connect the racket with the incoming ball as well as position our body in an appropriate position to return the ball in an efficient and effective manner.

Eye-hand co-ordination is the ability of the eyes and hands to work together as a dynamic whole. The process involves sharing information regarding the progress of one sub-movement with the centers controlling another sub-movement, ensuring that the second happens in appropriate relation to the first (Haggard, 1997).

Movement in response to stimulus during a game is almost one of the most important features of a good sportsman. If the athlete is unable to dodge a ball, pass and catch a ball, manoeuvre around a squash court or react to a spin ball, then they will not succeed in their sport. Since sport is typically performed under temporal constraints and varying levels of physiological stress / fatigue, attempts should be made to examine visual function under more realistic test conditions (Williams and Horn, 1995).