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CHAPTER – I

INTRODUCTION

1.1 General Introduction:

Numerous factors are responsible for growth and development of the young boys. The important aspect of growth and development are sometimes ignored and hence, the process of growth is affected. Again, the young children, especially, of the urban areas in modern days, are many times fall victim of the rapid change in changing socio - cultural and cyber - age life style.

A good number of parents are lacking in knowledge about the factors responsible for growth and development. A large number of children and adolescents are confined to their studies and hardly find any opportunity for movements due to lack of attitude and availability of facilities for participation in sports, games and other physical activities.

Apart from the genetic features, the growth of bones at the epiphyseal cartilage and diaphyseal shaft are dependent upon a number of humoral factors. The growth spurts during the age of 5 - 7 and 13 - 15 years in case of children accelerated for a number of factors. Amongst them the role of active function of Thyroxine ($T_4$), Tri – iodothyronine ($T_3$), TSH and GH play the key role (Rarick, 1966). Life style and / or participation in vigorous physical activity regulates the secretion of those hormones which ultimately lead to tissue growth, protein synthesis, active liver function, alteration of $T_3$, $T_4$ concentration (Total and Free) and fat mobilization (Goldberg and Goodman, 1969). These are the influencing factors of Growth dynamics.
From the viewpoint of sports and physical education, three aspects of growth and development are important. These are:

(A) Physical and Physiological Aspect (*height, weight, body composition and body proportion*);

(B) Psychological and Social Aspect

1. **Cognitive abilities** (perception, thinking, memory attention)
2. **Volitional qualities** (interests, attitudes, motives etc.,)
3. **Emotional qualities** (temperament, emotions, emotional control)
4. **Personality traits, and**
5. **Social behaviour**;

(C) Motor Development Aspect (*motor abilities, Movement skills, tactical efficiency and Motor performance and motor behavior*). (Sodhi and Sidhu, 1984).

As movement is the basis of life, the internal environment of the growing young cannot function properly or harmoniously unless he or she is engaged in vigorous physical activities. Recent studies confirm that physical inactivity is an important contributor to *obesity, diabetes, hypertension, heart disease, colon cancer, breast cancer, and premature death*. In addition, regular physical activity reduces feelings of depression and anxiety; helps to control weight; helps to maintain healthy bones, muscles, and joints; prevents falls among older people; reduces the risk of breast cancer; and promotes feelings of well-being.

Physical inactivity is a major contributor to premature mortality. A Report in January, 2000 to the President from the Secretary of Health and Human Services and the Secretary of Education mentioned that ‘*Physical inactivity has contributed to an unprecedented epidemic of childhood obesity that is currently plaguing United States.’*
In the course of growing up, a child learns not only about people and objectives in the world around him, but also about himself. The self-awareness is a growth process which begins in childhood and develops through his interaction with other members of the society and his total environment. It changes as he compares himself with his peers in competition, it changes as he develops confidence and courage and it changes according to his success and failure. Success enhances a child’s self-concept and he is, therefore, likely to seek areas where this can be found, and to avoid areas where failure is likely. There is general acceptance that children and adults with poor self-concept are more anxious and tense and less well-adjusted as compared to those having good self-concept.

There are adequate evidence to support the claim that exercise is related to positive mental health as indicated by relief in symptoms of depression and anxiety (Landers, 1997).

1.1.1 Active primitive life of man

Muhammad Ali, famous athlete, once quoted “Age is whatever you think it is. You are as old as you think you are.” And another proverb says, “You cannot have a young body with an old mind.” So, to live a long life one cannot be old at forty and decrepit at sixty. For that one has to be healthy, strong, vibrant, and active until a very advanced age. Thus, it may be safely assumed that primitive man was young until he got quite far advanced in age. He surely carried all his faculties and functions into old age.

What made him stay young in spite of his age, and why are we so different in that respect? Since nothing of basic character in man’s make-up has changed since primitive man roamed this earth except perhaps that his brain has developed into its
present stage we must presume that it was his life style which kept primitive man in good shape — his surroundings, activity and food.

Where primitive man lived a healthy, natural life; we, of today, do not. Our mode of living is highly artificial, pseudo active and for that we pay with years of life and the premature loss of our youthfulness. To regain our youth and enjoy longevity, we must either revert to nature or else imitate natural living conditions as far as possible. We have seen that physical work and the daily exercising of the body are good substitutes for the outdoor life of primitive man.

Primitive Nomadic (moving from place to place) lifestyles required the continual task of hunting and gathering food for survival (Anderson, 1985). Tribes commonly went on one- or two- day hunting journeys for food and water. Regular physical activity apart from that necessary for hunting and gathering was also a principal component of life. Following successful hunting and gathering excursions, celebration events included trips of six to 20 miles to neighbouring tribes to visit friends and family, where dancing and cultural games could often last several hours. This Paleolithic pattern of subsistence, pursuit and celebration, demanding a high level of fitness and consisting of various forms of physical activity, defined human life (Eaton et al., 1988).

The Neolithic Agricultural Revolution marked the conclusion of primitive lifestyle and signified the dawn of civilization. This historic period was defined by important agricultural developments including animal and plant domestication, and the invention of the ploughing. These human advancements made it possible for hunting-gathering tribes to obtain huge amounts of food while remaining in the same area, thus, primitive man transformed into an agrarian (agriculture and farming)
society (Garnsey, 1999). So, gradually daily physical activity decreased and simultaneously occurred a more sedentary lifestyle leads to hypokinetic diseases.

1.1.2 The consequence of Inactivity or hypokinetic lifestyle

The too little activity leads to hypokinetic diseases. It is a condition or disease resulting from a sedentary lifestyle or "too little activity of man." Examples include obesity, diabetes (Type II), backache, hyperlipidemia, osteoporosis, hypertension, etc... Etymologically Gk, ‘hypo’ means ‘under’ or ‘less’; ‘kinesis’ means ‘movement’ pertaining to diminished power of movement or motor function, which may or may not be accompanied by a mild form of paralysis.

Bouchard and Depress, (1995) also confirmed that the human body cannot be expected to function optimally and to remain healthy for extended periods if it is abused or not used as intended.

![Risk Factors of Hypokinetic Diseases](image)

Fig. - 1: Modifiable and non modifiable risk factors of hypokinetic Diseases
Prevention of Hypokinetic Conditions

Lifestyle activity is easier to incorporate into a hectic schedule. Planned exercise can be more of a challenge. There has been a shift from infectious diseases to diseases associated with too little movement. We move less, and therefore conserve lots of energy. Lifestyle activity is searching for opportunities to expend some extra energy.

The Center for Disease Control and Prevention (CDC), USA, has determined that lifestyle is the single largest factor affecting longevity of life Childhood obesity which is a national epidemic – partially due to technology. Parents need to be good role models and lead an active lifestyle - making sure their children accumulate at least sixty minutes of activity a day.

1.1.3 The general benefits of chronic physical activity

Hypokinetic Condition is the result of too little activity. It reduces weekly caloric expenditure and a significant impact on health from both lifestyle activity and planned exercise can be observed.

Significance of Physical Activity

Physical activity can prevent or delay the development of high blood pressure, and reduces blood pressure in persons with hypertension. Regular physical activity is also important for maintaining muscle strength, joint structure, joint functioning, and bone health.

Regular physical activity can help improve the lives of young people beyond its effects on physical health. Studies have found participation in physical activity increases adolescents’ self-esteem and reduces anxiety and stress (U.S. Department of Health and Human Services).
Through its effects on mental health, physical activity may help in increasing students’ capacity of learning. **Sallis et al. (1999)** found in their study that spending more time in physical education did not have harmful effects on the standardized academic achievement test scores of elementary school students; in fact, there was some evidence that participation in a two-year health-related physical education program had several significant favorable effects on academic achievement. Regular active participation in any sort of organized physical education programme is conducive for cognitive development of the participants.

Participation in physical activity and sports can promote social well-being, as well as good physical and mental health, among young people. Research has shown that students who participate in interscholastic sports are less likely to be regular and heavy smokers or use drugs, and are more likely to stay in school and have good conduct and high academic achievement (**Escobedo et al., 1993**).

Sports and physical activity programs can introduce young people to skills such as teamwork, self-discipline, sportsmanship, leadership, and socialization. Lack of recreational activity, on the other hand, may contribute to making young people more vulnerable to gangs, drugs, or violence (**Zill et al., 1995**).

The research literature suggests that for many variables there is now ample evidence that a definite relationship exists between exercise and improved mental health. This is particularly evident in the case of a reduction of anxiety and depression. There is now considerable evidence derived from over hundreds of studies with thousands of subjects to support the claim that “exercise is related to a relief in symptoms of depression and anxiety.”
1.1.4 The growth and development factors

Health care workers need to be aware of the various stages and needs of the individual to provide quality health care.

A study of the Division of Kinesiology in the University of Michigan lead by Borer (1995) suggests that the statural growth depends on a neuroendocrine programme which channels nutrient energy towards increments in lean body mass. Exercise can facilitate statural growth and is a necessary stimulus for reparative growth through its stimulatory effects on secretion of growth hormone (GH) and other anabolic hormones. An exercise-associated increase in GH secretion is a response to acute or prolonged exercise-induced fuel shortage that directs metabolism towards utilisation of lipids and promotes growth. Exercise can transiently block the expression of statural growth by competitively removing the necessary nutritional support for growth. Statural growth retardation can be corrected by catch-up growth, but stunting may also be permanent (depending on the timing and magnitude of the energy drain). Hypertrophic growth is less dependent on hormonal and nutritional support than statural growth, and exercise provides the necessary mechanical stress for growth and remodelling of the musculoskeletal system. Excessive mechanical strain may suppress hypertrophic growth. The intermittent nature of exercise provides temporal organization that is necessary for the normal operation of cellular growth process. Exercise by pregnant women does not appear to influence fetal growth. Evaluation of the effect of exercise on growth of children and adolescents is complicated by nonrandom selection of individuals for participation in organised sports, and by lack of information on the magnitude of exercise-induced energy drain. Exercise is essential for regulation of body composition in adulthood. It provides
mechanical and metabolic stimuli that are necessary for hypertrophy of the
musculoskeletal system and increased GH secretion for reparative growth.

Other researchers have found decreases in thyroid hormones in response to
physical exercise. Relative to sports scenarios, these studies have focused upon
prolonged endurance activities such as treadmill running for a few hours or marathon
running (Moore et al., 2005; Galbo, 1983).

Exercise is generally held to be a significant factor in the growth,
development, and health of children and adolescents. The effects of physical activity
regimens on general growth, as well as quantitative and qualitative changes, in animal
muscle and bone tissue have been clearly demonstrated.

The significance of physical activity in controlling body weight and
maintaining a healthy balance among the tissue components of growing children has
been repeatedly demonstrated. Similarly, research has shown the positive effects of
vigorous exercise regimens on muscular strength, muscular endurance, and physical
working capacity of children. Recent research points to a complex interaction of
neural, hormonal, and metabolic factors in response to the stresses imposed by
exercise - the effect on tissue and organ growth being a reflection of the nature,
duration, and intensity of the exercise regimen as well as the maturational level and
exercise tolerance of children. Those certain, as yet undefined, levels of physical
activity are essential to the normal growth and health of children would seem to be
self-evident. Based on present knowledge, these levels will vary with the nature of the
physical activity program and the functional capacity and maturational level of the
child (Rarick, 1975).

Recent research in several laboratories suggests that growth factors may act
locally to modulate bone formation by stimulating osteoblast proliferation and
activity. A number of bone-derived growth factors have been isolated and characterized from bone matrix extracts and from media conditioned by bone cells and bone organs in culture. The growth factors found in bone matrix include insulin like growth factors I and II, transforming growth factor-beta, acidic and basic fibroblast growth factor, platelet-derived growth factor, and bone morphogenetic proteins. Conditioned medium from bone cells contains several of these growth factors and also hematopoietic factors. These bone matrix-derived growth factors have different biologic activities, including mitogenic, differentiating, chemotactic, and osteolytic activities. Evidence suggests that bone cells produce substantial quantities of growth factors for extracellular storage in bone matrix. Apart from being produced for extracellular storage, it is possible that growth factors secreted by bone cells have acute effects on their neighboring osteoblastic cells, i.e., paracrine action, or on themselves, i.e., autocrine action. The release of matrix-stored growth factors by bone resorption may mean that growth factors act as delayed paracrine agents, e.g., osteoblasts deposit growth factors in bone and later when these growth factors are released from bone via bone resorption, the growth factors stimulate osteoblast precursors to proliferate. The findings that bone is a storehouse for growth factors and that bone cells in culture produce and respond to bone growth factors suggest bone growth factors may act as potential determinants of local bone formation. This review is focused on the structure, regulation, and biologic actions of the known bone growth factors (Mohan and Baylink, 1991).
Bone development is influenced by a number of factors, including nutrition, exposure to sunlight, hormonal secretions, and physical exercise. For example, exposure of skin to the ultraviolet portion of sunlight is favorable to bone development, because the skin can produce vitamin D when it is exposed to such radiation. Vitamin D is necessary for the proper absorption of calcium in the small intestine. In the absence of this vitamin, calcium is poorly absorbed, the bone matrix is deficient in calcium, and the bones are likely to be deformed or very weak. Vitamins A and C also are needed for normal bone growth and development.

Bone is deposited in proportion to the compression load that the bone must carry. For instance, the bones of athletes become considerably heavier than those of non-athletes. Also, if a person has one leg in a cast but continues to walk on the opposite leg, the bone of the leg in the cast becomes thin and as much as 30% decalcified within a few weeks, while the opposite bone remains thick and normally calcified. Therefore, continual physical stress stimulates calcification and osteoblastic deposition of bone, producing stronger bones.

Adolescence isn't the first time that humans grow by leaps and bounds. Babies' bodies change and grow dramatically. Children usually grow at a gradual,
steady pace until puberty, when growth occurs in an intense "spurt." The adolescent growth spurt typically begins in girls around the ages of 10 or 11 and peaks by age 12. Girls typically stop growing by the ages of 15 or 16. In boys, the growth spurt begins at 12 or 13, reaches a peak by age 14, and is typically over by the age of 19. Of course, adolescents don't develop all at exactly the same time. Some develop earlier than their peers, and others mature a bit later (Nancy, 1997).

Within the adolescent "growth spurt," teens and pre-teens experience "mini-spurts" of intense growth. They may experience growing pains; after all, their skeletons are being formed. During a one-year period of intense growth, boys can gain about 4 inches (10.16 centimeters) and girls about 3.5 inches (8.89 centimeters) in height (Nancy, 1997).

During adolescence, the body grows so fast those connective tissues such as tendons and ligaments become tighter—sometimes becoming very tight. If young athletes don't stretch before and after playing sports, growth-related pain can occur, particularly in the knees and lower legs. Most teen athletes will experience discomfort in these areas until their bones stop growing (Nancy, 1997).

During and immediately after growth spurts, students should avoid training on hard surfaces and monitor the intensity and duration of their workouts. It is also important to stretch regularly and perform low-level strengthening exercises. Heavy weights should be avoided (Nancy, 1997).

1.1.5 Hormonal regulation - its merits and demerits

Hormones that affect bone growth and development include those secreted by the pituitary gland, thyroid gland, parathyroid glands, and the ovaries and testes. The pituitary gland, for instance, secretes growth hormone (GH), also called somatotropin, which stimulates activity in the epiphyseal plates. This hormone is the main regulator
of height. Somatotropin plays many roles in the body: it stimulates bone and muscle growth, maintains the normal rate of protein synthesis in all body cells, and speeds the release of fats as an energy source for growth. Other hormones play a part in maintaining the strength and health of the bone matrix by functioning to control the level of blood calcium. In fact, calcium is needed for a number of metabolic processes other than for bone formation, including blood clot formation, nerve impulse conduction, and muscle cell contraction. When a low blood calcium condition exists, the parathyroid glands respond by releasing parathyroid hormone (PTH). This hormone stimulates osteoclasts to break down bone tissue, and as a result, calcium salts are released into the blood.

On the other hand, if the blood calcium level is excessively high, the thyroid gland responds by releasing a hormone called calcitonin. Its effect is opposite that of parathyroid hormone; it inhibits osteoclast activity allowing osteoblasts to form bone tissue. As a result, the excessive calcium is stored in bone matrix. The actions of these hormones are both excellent examples of some important negative feedback loops present in our bodies (Fig.-3). Without adequate supplies of these important chemicals, the bones will not develop or grow normally.

![Diagram of calcium regulation](https://example.com/diagram)

**Fig. - 3.** Parathyroid and thyroid glands function to control the level of blood calcium.  
(Courtesy: Wikipedia)
Tropic hormones are hormones that control the release of other hormones. That hormone will travel through the blood to the appropriate gland and cause the cells of that gland to all start releasing hormone. This system is especially advanced when controlled by the brain, like it is when our hypothalamus begins the process.

Therefore, use of tropic hormones allows for rapid hormone control, amplification of original signal (just a bit of tropic hormone can evoke a large release of the next hormone), and control of hormone release by the brain.

An example of tropic hormone use is that the hypothalamus secretes TRH (Thyrotropin Releasing Hormone) into the blood. This hormone causes the anterior pituitary to secrete TSH (Thyroid Stimulating Hormone) into the blood. This tropic hormone causes the thyroid gland to get going in releasing a thyroid hormone. Another example is that PRH (Prolactin Releasing Hormone) is a tropic hormone released by the hypothalamus that causes the anterior pituitary to release its hormone, PRL (ProLactin).

Tropic hormones can cause release of hormones (like the releasing hormones described above) or they can also inhibit release. PIH (Prolactin release-Inhibiting Hormone) can be released by the hypothalamus and decrease the amount of PRL released by the anterior pituitary.

Glands can sense the composition of the blood and respond to it. For instance, levels of calcium in the blood can influence whether the parathyroid gland will secrete PTH (ParaThyroid Hormone) and whether the thyroid gland will secrete calcitonin. Also, levels of glucose in the blood will affect whether the pancreas secretes insulin or glucagon into the blood.

Negative feedback is used to regulate hormones. Low levels of calcium in the blood can cause the parathyroid gland to secrete PTH (Fig. – 3). PTH causes calcium
to be extracted from bone, increasing blood calcium levels. However, as soon as the blood calcium levels reach their norms, it makes sense to stop secreting PTH so that we don’t have too much calcium extracted from our bones.

As soon as PTH does its job, PTH needs to be taken out of commission to prevent overdoing it. The only way our body can know if PTH has done its job is by evaluating calcium levels in the blood. When the calcium levels increase, no more PTH should be made.

Fig. - 4: Process of Negative feedback mechanism

Fig. - 5: Feedback control of thyroid function

In this image (Fig.- 4), the specific hormones are not identified. Instead, the diagram describes a scenario where two glands affect one another. In this example, only the hormone released by gland B (hormone B) has an effect on the target organ. But gland A releases a tropic hormone (hormone A) that influences the secretion of hormone B. Here, they show you that a tropic hormone no longer needs to be released once the hormone it triggers gets going. Therefore, hormone B has two effects... the effect we consider primarily is its effect on its target organ. But the other effect is back on gland A to prevent any more secretion of the tropic hormone, "hormone A."
An example of a real situation that could work like this is the release of PRH by the hypothalamus... If it works to cause PRL release in the anterior pituitary, then the hypothalamus should stop secreting PRH as soon as enough PRL enters the blood.

**Hormonal Control on Metabolism**

Metabolism is regulated at different organizational levels. With regulatory mechanisms that operate entirely within the individual cell, the main purpose is housekeeping, that is to adjust the catabolic pathways such as to keep up a ready supply of ATP, NADPH and so on. This is accomplished largely by feedback inhibition and feed forward activation by key metabolites such as ATP and acetyl-CoA. In contrast, hormonal control is about the obligations of a cell to the organism as a whole. Hormones are released in response to the prevailing metabolic situation of the body. Key examples are the secretion of insulin in response to high blood glucose levels, and the secretion of glucagon in response to low glucose levels. Hormones may also be secreted in anticipation of an imminent change of the metabolic situation, as is the case with the 'fight-and-flight' hormones epinephrine and norepinephrine. Other hormones with major effects on energy metabolism are the glucocorticoids (cortisone and hydrocortisone) and the thyroid hormones (tri-and tetraiodothyronine).

**1.1.6 Thyroid Hormone and Metabolism**

Thyroid Hormone lowers blood sugar through its effect on metabolism. However, it does not directly control levels of glucose, fatty acids or amino acids. Thyroid hormone does not respond quickly enough to changes in blood levels of glucose, amino acids and fatty acids.
The thyroid hormones, triiodothyronine ($T_3$) and thyroxine ($T_4$) are tyrosine-based hormones produced by the thyroid gland that are primarily responsible for regulation of metabolism. Iodine is necessary for the production of $T_3$ and $T_4$. A deficiency of iodine leads to decreased production of $T_3$ and $T_4$ enlarges the thyroid tissue and will cause the disease known as hypothyroidism. The major form of thyroid hormone in the blood is thyroxine ($T_4$), which has a longer half-life than $T_3$. The ratio of $T_4$ to $T_3$ released into the blood is roughly 20 to 1. $T_4$ is converted to the active $T_3$ (three to four times more potent than $T_4$) within cells by deiodinases ($5'$-iodinase).

The thyroid gland controls how quickly the body uses energy, makes proteins, and controls how sensitive the body is to other hormones. It participates in these processes by producing thyroid hormones, the principal ones being triiodothyronine ($T_3$) and thyroxine ($T_4$) which can sometimes be referred to as tetraiodothyronine ($T_4$). These hormones regulate the rate of metabolism and affect the growth and rate of function of many other systems in the body. $T_3$ and $T_4$ are synthesized from both
iodine and tyrosine. The thyroid also produces calcitonin, which plays a role in calcium homeostasis.

1.1.7 Role of $T_3$, $T_4$ in energy dynamics

The role of thyroid glands’ role in our body is to help it make the energy it needs, regulating the body's temperature and assisting other organs in their functions. While adding in producing energy, the thyroid manufactures two hormones, thyroxine and triiodothyrodine, that help burn fats, carbohydrates and protein to make the energy.

Thyroxine, or $T_4$, is the prohormone of the active hormone triiodothyronine, or $T_3$. The thyroid gland produces $T_4$ and $T_3$ at a ratio of 4 to 1. Thyroxine provides a circulating reservoir of active triiodothyronine. It is partly active at target tissues although it is approximately four times less potent than $T_3$. The majority of $T_4$ is rapidly converted to $T_3$ in target cells. The primary function of thyroid hormones is to regulate basal metabolism at rest and exercise.

- **Energy Production**
  $T_3$ stimulates basal metabolism and increases oxygen consumption and energy and heat production.

- **Glucose Metabolism**
  $T_3$ stimulates all aspects of glucose metabolism (Colorado State University website). It increases breakdown of glycogen, which is a molecule that stores glucose, it stimulates liver glucose production and it increases glucose uptake by all cells in the body. It also potentiates the action of insulin, the primary hormone that regulates glucose metabolism.

- **Protein Metabolism**
  $T_3$ stimulates both protein degradation and protein synthesis; however it more extensively increases protein degradation, especially in muscle. High levels of
thyroid hormone are associated with muscle wasting and decreased muscle strength. In children low levels of thyroid hormone can impair growth because of its affects on protein metabolism.

- **Fat Metabolism**

$T_3$ increases fat and cholesterol breakdown and enhances their utilization by other tissues. A common feature of a person with low levels of thyroid hormone is increased levels of circulating lipids and cholesterol. A 2002 review in the journal, "Hormones" notes that on the other hand that serum cholesterol and lipid levels are reduced in people with hyperthyroidism.

- **Weight loss and Thyroxine**

Thyroid gland can help or hurt efforts to lose weight. If thyroid gland is sluggish (hypothyroidism), it will begin gaining weight, but if it is hyperthyroidism or an overactive thyroid gland, it is going to be losing weight. So one way people have tried to lose weight is by stimulating their thyroid gland into being more active than usual.

### 1.1.8 Mental Development and self – concept

*Self–concept is defined as the mental image one has of oneself.* Psychologically it is the whole set of attitudes, opinions, and cognitions that a person has of himself. People may possess several self-concepts, which are dependent on context, time and place. Self-concepts arise from the perceptions individuals have about themselves.

A self-concept refers to the knowledge; ideas and beliefs possessed about the self and are comprised of descriptions, values and expectations (Hattie, 1992). Self-esteem on the other hand refers to the evaluations and judgments made of one’s self-concept (Mussen, Conger & Kagan, 1984).
Self-concept is the image that we have of ourselves. This image is formed in a number of ways, but is particularly influenced by our interactions with important people in our lives. Self concept is a cognitive or deceptive component of one’s self, while self esteem is evaluative opinionated.

According to a theory known as social identity theory, self-concept is composed of two key parts: personal identity and social identity. Our personal identity includes such things as personality traits and other characteristics that make each person unique. Social identity includes the groups we belong to including our community, religion, college, and other groups.

So, self – concept is that how we think about or evaluate ourselves. It includes: physical, moral, personal, family, social situation dimensions. Self-concept is influenced by our sense of identity. Two things have powerful effects on our self-concept:

a) The opinions and judgments other people make of us;

b) Social comparisons - perceptions of the ways in which one is similar to and different from other people;

These will, in turn, influence a very important part of our self-concept: our self-esteem. Bracken (1992) suggested that there are six specific domains related to self-concept:

I. Social - the ability to interact with others;

II. Competence - ability to meet basic needs;

III. Affect - awareness of emotional states;

IV. Physical - feelings about looks, health, physical condition, and overall appearance;

V. Academic – success or failure in school;
VI. Family - how well one functions within the family unit;

Humanist psychologist Carl Rogers believed that there were three different parts of self-concept:

1. **Self-image** or how one sees himself. It is important to realize that self-image does not necessarily coincide with reality. People might have an inflated self-image and believe that they are better at things than they really are. Conversely, people are also prone to having negative self-images and perceive or exaggerate flaws or weaknesses. For example, a teenage boy might believe that he is clumsy and socially awkward when he is really quite charming and likeable. A teenage girl might believe that she is overweight, when she is really quite thin. Each individual's self-image is probably a mix of different aspects including your physical characteristics, personality traits, and social roles.

2. **Self – esteem** or how much you value yourself. A number of different factors can impact self-esteem, including how we compare ourselves to others and how others respond to us. When people respond positively to our behavior, we are more likely to develop positive self-esteem. When we compare ourselves to others and find ourselves lacking, it can have a negative impact on our self-esteem.

3. **Ideal self** or how you wish you could be. In many cases, the way we see ourselves and how we would like to see ourselves do not quite match up.

Theories of Self-Concept emphasize how identity is constructed through interaction with others. Pragmatic theories emphasize social processes of interacting within a community. A dramatistic view describes the role performances that people enact in creating an identity. Postmodern views of self observe how a relational
Self-concept or self-identity is the sum of a being's knowledge and understanding of his or her self. The self-concept is different from self-consciousness, which is an awareness of one's self. Components of the self-concept include physical, psychological, and social attributes, which can be influenced by the individual's attitudes, habits, beliefs and ideas. These components and attributes can not be condensed to the general concepts of self-image and self-esteem (Courtesy: Wikipedia). These self-perceptions are dependent on the social interactions with others.

Interpersonal identity development is composed of three elements:

➢ Categorization: Labeling others (and ourselves) into categories.
➢ Identification: Associating others with certain groups.
➢ Comparison: Comparing groups.

Interpersonal identity development allows an individual to question and examine various personality elements, such as ideas, beliefs, and behaviors. The actions or thoughts of others create social influences that change an individual. Examples of social influence can be seen in socialization and peer pressure. This is the effect of other people on a person's behavior, thinking about one's Self, and subsequent acceptance or rejection of how other people attempt to influence the individual. Interpersonal identity development occurs during exploratory self-analysis and self-evaluation, ending at various times with the establishment of an easy-to-understand and consolidative sense of self or identity.

During the interpersonal identity development an exchange of propositions and counter-propositions occurs, resulting in a qualitative transformation of the
individual in the direction of the interaction. The aim of the interpersonal identity development is to try to resolve the undifferentiated facets of an individual. The individual's existence is undifferentiated but this is found to be indistinguishable from others. The individual is led to a contradiction between self and others, thus forcing the withdrawal of the undifferentiated self as a truth. In resolution of this incongruence, the person integrates or rejects the encountered elements. This process results in a new identity. During each of these exchanges which human beings encounter as they go through life, the person must resolve the exchange and then face future exchanges. The exchanges are recurring, since the changing world constantly presents exchanges between individuals and thus allows individuals to redefine themselves.

An individual is also influenced by their family, whether they be biological, extended or even adoptive families. Each has their own influence on identity through the interaction that takes place between the family members and with the individual person (Grotevant, 1997). "Information regarding possible identities of possible selves comes from various contexts that surround adolescents and temporal commitments are tested and practiced in interaction with others." (Goossens, 2008).

Researchers and theorists basically state that an individual's identity (more specifically an adolescent's identity) is influenced by the people around them and the environment in which they live. Also if a family does not have integration this seems to help create identity diffusion [this is one of James Marcia's 4 identity statuses, meaning that an individual has not made commitments and does not try to make commitments (Steinberg, 2008)].
1.1.9 Regular active participation in sports and its influence upon self – concept

The Report from the United Nations Inter-Agency Task Force on Sport for Development and Peace states that young people can benefit from physical activity as it contributes to developing healthy bones, efficient heart and lung function as well as improved motor skills and cognitive function. Physical activity can help to prevent hip fractures among women and reduce the effects of osteoporosis. Remaining physically active can enhance functional capacity among older people, and can help to maintain quality of life and independence.

Play helps the participant to be a good loser or winner, to eliminate jealousy, bitterness and ill will (Clunk, 1950; Jackson, 1957; Frust, 1966).

Exercise may provide a series of graded mastery experiences that may enhance self-efficacy, increase the probability of coping, and improve self-concept (Bandura, 1977; Beck, Rush, Shaw, & Emery, 1979).


In a review of randomized, controlled trials of habitual aerobic exercise, Hughes (1984) concluded that self-concept was the only variable that showed consistent improvement with exercise across studies.

WHO has estimated that “one in four patients visiting a health service has at least one mental, neurological or behavioural disorder, but most of these disorders are neither diagnosed nor treated”. A number of studies have shown that exercise may play a therapeutic role in addressing a number of psychological disorders. Studies also show that exercise has a positive influence on depression. Physical self-worth and physical self-perception, including body image, has been linked to improved self-esteem.
Marsh (1998) repeatedly revealed that adolescent athletes have higher self-esteem than do non-athletes. For instance, Marsh and colleagues (1995) found that elite athletes had significantly higher ratings of general self-esteem and greater perceived physical competence than did non-athletes.

Swain and Jones (1992) reported that athletes higher in competitive orientation had higher self-concept than did athletes who scored lower in competitive orientation. Although the direction of this relation is unclear, Swain and Jones suggested that individuals who are confident are more likely to be driven to compete, and/or that a more competitive athlete is likely to feel more confident in a competitive environment.

Given that physical self-concept is particularly important for adolescents, it is possible that individuals who engage in regular physical activity may have higher self-concept in this regard (Findlay and Bowker, 2009).

The evidence relating to health benefits of physical activity predominantly focuses on intra-personal factors such as physiological, cognitive and affective benefits, however, that does not exclude the social and inter-personal benefits of sport and physical activity which can also produce positive health effects in individuals and communities.

The popularity of high school athletes could be due to the social status our society accords professional athletes; or perhaps the high visibility of athletes accounts for their value to their peers. Research shows that the development of self – concept is based primarily on physical competence.

Some studies also show that the physical programs contribute to the development of a favourable self – concept. Therefore, athletic programmes can and should make beneficial contribute to the self – concepts of the participants.
1.2 Statement of the Problem:

The internal environment of the growing students cannot function properly or harmoniously unless he or she is engaged in vigorous physical activities. But now a day, students have hardly any time to be engaged in such type of programmes. In some cases, parents are either indifferent regarding this matter or lacking in knowledge about the factors responsible for growth and development. A large number of children and adolescents are confined to their studies and hardly make any opportunity for movements due to lack of attitude and availability of facilities for sports, games and other physical activities except ‘occasional’ participation in classes of Physical Education.

In our country, we need prudential approaches with the application of scientific knowledge and wisdom. Unless the whole affair is envisaged with a scientific view, the craze for a remedial positive effect which encompasses the gamut of growth and development cannot be materialized. With such backdrop, the study is intended.

Thus, the study has been entitled as “COMPARATIVE GROWTH DYNAMICS OF SPORT PARTICIPATION ON T₃, T₄, TSH AND SELF-CONCEPT OF YOUNG MALES”.

1.3 Purpose of the Study:

From the different studies, it is evident that some changes are envisaged during different phases of growth and development. The objectives of the present study are:

1. To compare the changes of T₃, T₄, and TSH during different phases of growth of different samples.

2. To correlate morphological parameters with the functions of T₃, T₄, and TSH amongst different samples.
3. To compare the cardiovascular function of the changes in predicted VO$_{2\text{max}}$ at different phases amongst the samples.

4. To compare the development of Self - Concept of the young students at different phases of growth and development.

5. To find out specific interrelations amongst the dependent variables on Anthropometric, Physiological, Biochemical and Psychological dimensions in the course of growth and development during growth spurt.

1.4 Significance of the Study:

   i. This study may help us to find out the merits of Active participation in games and sports on growth and development;

   ii. The findings may help the coaches and physical educators to develop appropriate training program;

   iii. The study may spot out some cardinal potentialities which may serve the prerequisites to growth and development.

   iv. The present study would highlight some of the important factors which may be helpful in selecting mental development.

   v. This may grow a positive attitude towards physical fitness and good health.

1.5 Delimitations of the Study:

   - The subjects of the study were delimited only to Mathurapur, South 24 Parganas, West Bengal, India
   - The study was confined only to male subjects.
   - The age of the subjects was restricted to 13 – 15 years.
   - Twenty four (12 + 12) subjects were taken for this study.
Only one year was considered for duration of this longitudinal study.

1.6 Limitations of the Study:

(i) For collecting data the latest sophisticated instruments were not used always.

(ii) The temperature of the testing time was no controlled.

(iii) The effect of diurnal variation, if any, was beyond the control of the investigator.

(iv) Dearth of facility compels the researcher to predict $V_{O_{2max}}$ from Exercise HR instead of direct measurement.

(v) The sample size of the study was only twelve in each group.

1.7 Hypotheses:

$H_1$: There will be significant variation in biochemical variables of the subjects.

$H_2$: There will be difference in morphological parameters with the functions of $T_3$, $T_4$, and TSH amongst different samples.

$H_3$: There will be difference in cardiovascular function of the changes in predicted $VO_{2max}$ at different phases amongst the samples.

$H_4$: There will be difference in the development of Self - Concept of the young students at different phases of growth and development.

1.8 Definition of Terms:

- Hypokinetic Conditions: Conditions that result from too little activity
- WHO: World Health Organization
- $VO_{2max}$: The maximal rate at which oxygen can be consumed per minute; the power or capacity of the aerobic or oxygen system.
- Nomogram: A graph enabling one to determine by aid of a straight-edge; the value of a dependant variable when the values of two independent variables are known.
- Ossification is the formation of bone by the activity of osteoblasts and osteoclasts and the addition of minerals and salts
- Osteoblasts: cells that help form bone
- Osteoclasts: cells that help eat away old bone.
- Matrix: a bonding of multiple fibers and chemicals