

**AN EXPLORATION OF THE CONCEPT OF
BALOPĀSANĀ IN SANSKRIT LITERATURE TO
PRESENT RELEVANCE OF KRĪḌĀVAIDYAKA
(SPORTS MEDICINE)**

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by

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October 2018

CERTIFICATE

This is to certify that thesis entitled “**An Exploration of The Concept of Balopāsanā in Sanskrit Literature to Present Relevance of Krīḍāvaidyaka (Sports Medicine)**” which is being submitted herewith for the award of degree of Vidyavachaspati (Ph.D) in Sankrit of **Tilak Maharashtra Vidyapeeth, Pune** is the result of original research work completed by **Mrs. Amruta Saurabh Deshmukh** under my supervision and guidance. To the best of my knowledge and belief the work incorporated in this thesis has not formed the basis for the award of any Degree or similar title of this or any other University or examining body upon her.

Place: Pune

(Dr. Shripad Bhat)

Date: October 2018

Research Guide

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Amruta Saurabh Deshmukh

List of Abbreviations

- सु. सू. : Suśruta Saṃhitā Sūtrasthāna
वा.य. : Vājaseniya Yajurveda
ऋ. : Ṛgveda
अथर्व. : Atharva Veda
यजु. : Yajurveda
छं.उ. : Chāṇḍogya Upniṣada
मुं.उ. : Muṇḍakopaniṣada
बृ. उ. : Bruhadāranyaka Upniṣada
तै. उ. : Taittiriya Upniṣada
भाग. : Bhāgvat Purāṇa
ह. पु. : Harivaṃśa Purāṇa
ध. वे. : Dhanurveda
च.सू. : Caraka Saṃhitā Sūtrasthāna
सु.चि. : Susruta Saṃhitā Cikitsāsthāna
वा.सू. : Vāgbhata Sūtrasthāna
च.वि. : Caraka Saṃhitā Vimānasthāna
अ.सं.शा. : Aṣṭaṅga Saṅgraha Śārīrasthāna
च.शा. : Caraka Saṃhitā Śārīrasthāna
सु.शा. : Susruta Saṃhitā Śārīrasthāna
शा.सं.प्र.खं. : Śaraṅadhara Saṃhitā Pratham khaṇḍa
च.चि. : Caraka Saṃhitā Cikitsāsthāna
च.वि. : Caraka Saṃhitā Vimānasthāna
च. सि. : Caraka Saṃhitā Siddhisthāna
अ.सं.सू. : Aṣṭaṅga Saṅgraha Sūtrasthāna

च.नि.: Caraka Saṃhitā Nidānasthāna

भा. प्र. : Bhāva Prakāśa Saṃhitā

अ. ह्र. सू. Aṣṭaṅga hrudaya Sūtrasthāna

अ.सं. उ.: Aṣṭaṅga Saṅgraha Uttaraṣṭhāna

सु. उ.: Susruta Saṃhitā Uttaraṣṭhāna

प यो सू.: Patanjali Yoga Sūtra

ROL: Review of Literature

ABSTRACT

This study is entitled as “*An Exploration of The Concept of Balopāsanā in Sanskrit Literature to Present Relevance of Krīḍāvaidyaka (Sports Medicine)*”. This study is oriented towards exploration of the concept of Balopāsanā in Sanskrit literature and studying its applicability with the present relevance of sports. This work is carried out in two parts. Part one includes compilation of chronological evolvement of the concept of Balopāsanā. Part two is directed towards exploration of the link between Balopāsanā, vyāyāma and Āyurveda and explaining its relevance with the present application in the field of fitness. The study concluded that concept of Balopāsanā existed in Sanskrit literature is holistic in nature involving physical, psychological, intellectual and spiritual aspects and it is relevant with the need of present Krīḍāvaidyaka field. Modules of Balopāsanā are complimentary to physical training to develop holistic fitness

Key Words: Bala, Upāsanā, Vyāyāma, Āyurveda, Fitness, sports medicine, Krīḍāvaidyaka

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Chapter 1

Introduction

Background

Central concept of this study is 'Balopāsanā'. It is 'Yogarūḍha' type of concept in Sanskrit literature. The word Balopāsanā includes two words, 'Bala' and 'Upāsanā'. The literal meaning of Bala is

सामर्थ्यम् क्रियानिर्वर्तनक्षमता ।

सु. सू. १ टीका

'Sāmarthyam kriyānirvartanakṣmatā. This is an umbrella term covering strength, power, fitness, ability or stamina. Upāsanā suggests worship of something or strive for something. Thus, meaning of Balopāsanā becomes worship of Bala or striving for Bala.

This study is oriented towards exploration of the concept of Balopāsanā in Sanskrit literature and studying its applicability with the present relevance of sports. This work is carried out in two parts. Part one includes compilation of chronological evolvement of the concept of Balopāsanā. Part two is directed towards exploration of the link between Balopāsanā, vyāyāma and Āyurveda and explaining its relevance with the present application in the field of fitness.

The concept of Balopāsanā is referred in Sanskrit literature with various contexts, ranging from physical strength, army strength, and spiritual journey towards ultimate divine i.e. Mokṣa. The scope of this study includes understanding the scope of this study includes understanding the relevance of the concept of Balopāsanā with physical aspects i.e. fitness, strength, with special reference to health and sports, this study aims towards developing an evidence-based module of Balopāsanā, which will be explored ancient Indian philosophy.

This is done by studying the prevalence of application of physical fitness at present and understanding the need of holistic module. Chronological evolvement of concept of Balopāsanā is studied to develop the holistic module of Balopāsanā.

Sports and fitness have been integral part of human life since its origin. It has been documented since Vaidika period. Exercises have been advised for better physical strength to achieve the goal of mokṣa in Vaidika literature. Further in Āyurveda, exercise and sports have been discussed as the integral part of daily routine (Dinacaryā) for health, prevention and also as the intervention in treatment of diseases.

Today the idea of fitness is dominating the fields of health and recreation. Fitness is defined as the ability of a person to perform a particular task without undue fatigue (Yocom, 1951). It is a broad concept. It implies to the capacity of each person to live life most efficiently within less potentialities. Ability to function depends on physical, psychological, social and spiritual components. But generally, it is referred as physical fitness.

The components of health-related fitness and sports related fitness are different. The components of health-related fitness are a basis from which one can measure general well-being of a person. Different sports are more demanding and require different levels of fitness; it is referred as skill related fitness. Components of health-related fitness are body composition, cardio-respiratory endurance, flexibility, strength and muscular endurance. In addition to this skill related fitness is composed of agility, speed, power, balance, co-ordination and reaction time. Irrespective of any specific sports these skills are required in everyday normal life to different extent. During time of illness or in ageing these components are reduced.

Presently two major streams of fitness are practiced, one is directed towards health and wellbeing and another is focused towards sports related fitness. The fitness industry has witnessed an unprecedented growth in last two decades across the world. According to the reports of Global wellness summit 2017, the wellness and fitness market in India has registered a growth with the rate of 18-20% since 2012. Indicators of this increase in fitness sector are, increase in gym memberships, time and money spent on fitness, growth in number of fitness clubs, yoga centers, sports clubs, sports channels, sports tournaments, sports viewership and increased mobile friendly applications and wearable fitness gadgets like mobile watches and activity trackers are the topmost point of these indicators which shows the growing interest in the field of fitness and sports.

Driving forces of health-related fitness trends and sports related fitness trends are different. Health related fitness is driven towards prevention and treatment of lifestyle diseases like obesity, diabetes mellitus, and heart diseases are major driving forces behind the movement of fitness.

Urbanization, highly mechanized appliances and increasing sedentary lifestyle are leading towards physical inactivity in past few decades. Reports of physical activity and inactivity in India suggest 54.4% people being inactive with higher percentage of males than females and demographically from urban compared to rural population. It is aggravated with consumption of highly processed food. Together has lead obesity to epidemic proportions in 21st century across the world and India. Surveys reveal increase in obese population from 857 million in 1980 to 2.1 billion in 2013 in India. Obesity is associated with lifestyle or metabolic disorders like diabetes mellitus and heart diseases. According to the survey 62 million Indians are diabetic, which is more than 7.1% of adult population of the country. Cardiovascular diseases are another leading lifestyle epidemic across the word and India. Studies have reported increasing prevalence of heart diseases over last 60 years, from 1% to 9-10% in urban population and 1% to 4-6% in rural population in India.

Lack of activity, lack of exercise, increased availability of processed food, intake of junk food, sedentary lifestyle, stress are underlying causes of obesity. Obesity further leads to diabetes cardiovascular diseases.

Regular exercise is one of the preventive and curative measures for this vicious cycle of lifestyle epidemic of obesity and its associated complications of diabetes and heart diseases. Hence it is being advised and promoted by healthcare professionals. This is one of the reasons behind increasing awareness about regular exercise in the society. People are trying to be more active in various ways like walking, jogging running, yoga, regular gym, amateur sports activities, trekking, etc. and it involves recreational activities too. As suggested by wellness trends 2017, sauna, art and creativity mental peace and silence are pursued for wellness along with physical exercise. These types of Health-related fitness activities are pursued by people of age between 30 years to 45 years and above, who are either detected with lifestyle diseases or want to protect themselves from lifestyle diseases or its complications. Mental stress is also a major driver of health-related fitness activities.

Another important driver behind these health-related fitness activities is look good or feel good factor. Young population of age 20 years to 30 years aspire to look physically good or physically fit. Mostly their aspirations are motivated from Bollywood or Hollywood celebrities. These celebrities hold a great potential to make social impact as they are related with strong network of social media and entertainment. The making of six pack muscles became a style statement and inspires people for the same. Making of Sports biopics, healthy lifestyles of Bollywood celebrities inspire people positively to pursue the same. As per analysis of health and fitness industry done by Nikhil Chhabra (2016), there is 20-30% growth in fitness industry in India every year.

Sport is another fitness centric field which is further divided into professional sports and amateur sports. India is being considered as sleeping giant in sports, as it is emerging as the competitive entity on the horizons of sports. Growing participation and success in international competitive sports in past two decades is suggestive of increasing trends of interest of participation in professional sports in India. Success in ICC world cup 2011, consistent top position in all formats of cricket and in ICC women world cup 2016, success in Olympic 2012 and 2016 in wrestling, badminton, shooting and badminton world championship 2017 are symbolic of it.

Over the years, sports have evolved as noticeable sector of all economies presenting myriad career as well as business opportunities. The scope of this sector varies globally. It includes various segments. Moreover, the business of sports is not limited to the participation avenues; it has far reaching implications on global economy due to its close association with other sectors. Sports contribute significantly towards improving the overall health and well-being of a country. In 2014, the global sports market was approximately 1% of global GDP. It has shown annual growth of 4.6% by 2017. Indian sports sector is going through significant developmental transition. In 2016, government has accorded an industry status to sports. While cricket dominates the sports field in India, the country has also embraced other sports with great enthusiasm. Following the Indian Premier League (IPL) of cricket, eight major league-based sports tournaments have launched during 2013 to 2015. These include Indian super league (ISL) of football, Pro kabaddi League, Badminton league, Wrestling league etc. Pro Kabaddi league and Indian Super League witnessed amazingly high cumulative viewership on TV and stadiums too. It has shown 20-25% growth annually. Pro kabaddi has set a classical example of how a

sport can quickly developed from just a local rural sport to an international level sport. It has gained interest of million fans including children, women from urban as well as rural India and across the world. Increasing viewership for other sports along with cricket is observed for Football, Tennis, Kabaddi, Hockey, Badminton, Wrestling and during Rio Olympics 2016, despite of odd hours of telecast. This encouraging viewership is one of the strong indicators of all-inclusive rise in sports consumption in India. Well-structured sponsorship programs advertisements are giving rise to the popularity of sports. Performance of Indian athletes has improved relatively from the past at Asian games, common wealth games and Olympics too. In non-Olympic sports like cricket, Kabaddi India has been excelled.

In addition to this, league sports are taking dedicated efforts on developing sports culture in various ways. They are setting up academies for budding athletes, e.g. Pro Kabaddi League is running parallel junior league on the same platform, Indian Super League teams are emphasizing on inclusion of young players in the teams.

Altogether there is an increasing scope in the sports field and many more youngsters are taking up sports as their career activity, because of glamour, dynamism, passion patriotism and commercials involved in the field. Thus, the fitness industry has come a long way from local ākhādā to providing international services.

History of Evolution of concept of Balopasana:

Throughout the pre-historic time man's quest for fitness is driven by his desire to survive and he did it in various forms like hunting, exercising, wars and entertainment. If we take a close look evolvement of concept of fitness, we come across the concept of Balopāsana in Sanskrit literature. It dates back to the human origin. Vedas being oldest heritage of literature of oldest human civilization in the world i.e. Indus valley civilization.

Historical study of sports and exercise in India starts from Vedic period and further it can be divided as follows:

1. Vedic period and pre-historic period (B.C.E- 2000-600)
2. Medieval age and historical period (B.C.E 600 to B.C. 1750)
3. Pre-independence period (B.C 1750 to 1947)

4. Post-independence period (post 1947)

During these respective periods the need and purpose of pursuing physical exercise and sports were different.

1. Vedic period and pre-historic period (B.C.E- 2000-600)

Vedic and pre-historic period is early age of human civilization. The basic need was existence and self-defense. In Vedas the concept of Bala (Strength) is discussed in various contexts ranging from physical fitness, armory strength to spiritual abilities ultimate divine i.e. Mokṣa. Physical strength is discussed as the prime attribute of Bala. Since the basic disease-free state of physical fitness is needed for spiritual sādhanā. It is mentioned in Sanskrit proverb,

शरीरम् आद्यम् खलु धर्म साधनम् ।

“Śarīram ādyam khalu dharma sādhanam.” Vedas give evidences of mṛgayā (hunting), aśvārohaṇa (horse-riding) as sports for entertainment. Digging is mentioned as the form of exercise for attaining physical strength. Dhanurveda is upaveda dedicated for war techniques; it includes archery, fencing, boxing etc. Muṣṭiyudha (boxing) is considered as the best war force. Ṛgveda gives the evidence of use of herbs to enhance Bala. Dhanurveda depicts evidences of use of herbs and ghee to treat war injuries.

Āyurveda is upaveda of Atharvaveda. It is the science of life and discusses everything about life. It is primarily conservation of healthy long-life and then towards treatment of diseases. Literature of Āyurveda gives detail description of the concept of Bala, vyāyāma (physical exercise) for healthy long-life and as a treatment modality too. This is explored in detail in this study.

Upaniṣads give references of use of Āryavaidyaśāstra i.e. Āyurveda; for conservation of Bala and long-life. It is needed for highest spiritual attainment of brahmahrāptī. Yogaśāstra is dedicated for control of mind (*Yogahcittavrutinirodhah*). Aṣṭāṅga Yoga is the path of life advocated for attaining the ultimate divine. In Yogaśāstra physical strength, steadiness and disease-free state are considered as prime attributes towards mental and spiritual sādhanā. For attaining these physical characteristics āsana, prāṇāyāma, are dedicated aspects of Aṣṭāṅga yoga. Yama, Niyama includes also include lifestyle aspects for physical health. In Yogaśāstra also Āyurveda is advocated for treatment of physical ailments and enhancing physical strength.

2. Medieval Age and historic period (B.C.E 600 to B.C. 1750):

During this period, various empires were spread across India. The concept of Bala was referred for maintaining the winning war streak for protection of land from invaders like Muslims and protecting religion and cultural heritages. Wrestling, boxing, horse-riding fencing, archery, javelin throw were the forms of war techniques.

Sports like Mṛgayā (Hunting), aśvārohaṇa (horse-riding), nṛtya (dance), sangīta (music) and nāṭya (drama) were the forms of entertainment. Prāṇāyāma, Sūryanamaskara were followed as the form of exercise for physical and mental fitness.

During this time Samartha Ramdas Swami initiated campaigning of Balopāsanā across India. Lord Hanumān was worshiped as lord of Bala. This campaign of Balopāsanā was initiated for protection of Hindu religion, as Muslim invaders were being stronger during this time. Hindu people were not united, so to bring about the revolution and for protection of religion and self-defense Samartha Ramdas Swami selected the Lord Hanumān as a symbol of strength for this campaigning of Balopāsanā. He established temples of Hanumān in the most part of India. He educated youth to band together, to combat despots and plunderers. He stressed importance of courage and knowledge. He established well-equipped ākhāḍā in each temple of Hanumān and advocated Sūryanamaskara and physical exercises insisting that the weak is not able to bring the change. Sit-ups, push-ups, lāthi-kāthi, dandpattā, wrestling were the other forms of exercises included in ākhāḍā. This was the period of Maratha Chatrapatī Śivāji Mahārāja from Maharashtra, who fought against Muslim empires with the help of army of local people called Māvāla. Further during Peśava empire, this tradition of youth for wars was continued. Mallakhāmb, mallavidyā and war trainings were included to strengthen the physique of army.

3. Pre-independence period (B.C 1750 to 1947)

British empire originated in India with overseas possessions and trading posts in late 16th century and continued till early 18th century. During this period, traditional Balopāsanā practices were continued but were hindered under influenced by British culture. Freedom fighters continued to follow traditional physical exercises for strengthening physique and mind. Traditional war techniques like fencing, boxing, javelin throw, dandpattā, etc. remained as exhibition or demonstration and overlooked as an entertainment.

British people were playing various team games like Football, cricket. They introduced these games in India. During their tenure they invented individual game of badminton in India. They initiated these sports and physical exercises for entertainment. They incorporated physical education as a part of formal education system.

4. Post-independence period (B.C 1947 onwards)

India got freedom British empire in 1947. After this, sports and physical education was included in formal education curriculum. Sports development was included in five-year government planning. Curriculum of physical education was formed, and various institutions were originated e.g. Rani Laxmibai Physical Education University, Sports Authority of India, Indian Olympic Association and Federations of various games. Various national, state, district level competitions were started.

Thus, the concept of Balopāsanā in India has evolved through various transitions with the need of respective time, space and societal needs. Same is observed across worldwide. If we study the movement of Olympism, it was started in Greece with the religious aspect in 776 B.C. It continued for almost 12 centuries. Olympics was a sporting meet for all Greek states where various sports were included. It was organized once in four years. The purpose of the games was to give the opportunity to young men to show their physical abilities and to enforce the peaceful relationship between various Greek cities. The invasion of the Macedonians put an end to the Greek city-states and, relieved of the political controversies, they devoted themselves entirely to the Olympic Games. Full credit for the revival of the Olympic Games in the modern era must go to Baron Pierre de Coubertin. At the age of 17 he began to scrutinize the weaknesses of his people who were trying to recover hope and self-respect following the Franco-Prussian War. He visited England and America where he studied organized athletics conducted by the students.

He observed that competing for a place on an athletic team developed qualities of character whereas the attitude in French schools was that games destroyed study. He was convinced that he should devote his entire time and energy to securing a pedagogical reform in his own country. He decided to start at the bottom because, as he expressed it, "the foundation of real human morality lies in mutual respect-and to respect one another it is necessary to know one another."

In the spring of 1894 at an international congress which he had assembled to the purpose of studying the questions of amateurism. At this meeting, official delegates from France, England,

the United States, Greece, Russia, Sweden, Belgium, Italy, and Spain, were in attendance. Hungary, Germany, Bohemia, Holland and Australia sent proxies or letters.

Seven questions concerning the problem of amateurism were on the agenda and Coubertin took the liberty of adding an eighth, "Regarding the possibility of the revival of the Olympic Games." Coubertin imparted his enthusiasm so well that it was unanimously agreed on June 23, 1894 to revive the Games and an International Committee was formed to look after their development and well-being.

Two years later, in 1896, Greece celebrated in the rebuilt stadium of Athens, the first Olympic Games of the present cycle and from this beginning, the world's greatest athletic spectacle was established.

After reviewing the present prevalence of fitness and sports and its chronological evolvement in India, we have observed that, the concept of Bala and Balopāsanā is eternal since human origin. Expression and display of strength is one of the basic needs of human being. The way of expression of Bala or strength is varying with the time, place and need. Earlier it was a need for existence and self-defense, further it was expressed through conquering in wars and by geographical invasions etc. Then there was a need of peaceful establishment of society, but maintenance of winning streak was constant, hence it gave rise to sports, and competition as the way of peaceful way of expression of superiority and entertainment was also achieved out of it. With the industrial development, physical fitness became a need of maintenance of health and well-being it gave rise to the health-related fitness field.

Present Relevance of Krīḍāvaidyaka and The Concept of Balopāsanā:

It has been closely observed from the chronological evolvement of concept of Balopāsanā that; physical fitness has always been an important part of it, whether it is leading towards spiritual journey to the ultimate divine or not. Since physical body is the medium or vehicle of this journey. In this way, Indian philosophy gives the holistic approach to the concept of Balopāsanā, still maintaining the urge winning in sports intact.

The present study is oriented towards the exploration of the concept of Balopāsanā in Sanskrit literature to the present relevance of Krīḍāvaidyaka (sports medicine). For this researcher has reviewed the chronological evolvement of the concept of Balopāsanā since Vedic period and studied its present prevalence. It has been observed that, physical fitness for sports and health

related fitness are prevalent aspects of it. Researcher has focused on sports related fitness part for this study.

Statement of the Problem:

In the field of sports; physical fitness, competitive sports performance and perseverance of performance are the keys of success of any athlete's life. To achieve glamorous sports career and limelight, athletes need to strive through regular strenuous training schedules to attain elite level of physical fitness. They must uphold the optimum levels of fitness for longer period of life.

Prolonged training and competitive seasons exert more stress and cause excessive wear and tear of their body as compared to sedentary people. Accidental injuries, overuse injuries, overtraining syndrome etc. are the obstacles in the success path of an athlete. These obstacles not only crack the success story of an athlete but also endanger the life of an athlete. Hence along with the performance and laurels, it is necessary to protect the health of vital organs for longevity of sports career and longevity as well. Thus, maintaining the balance of performance and health has always been a great challenge for athletes and coaches. For this reason, the field of sports sciences and sports medicine have emerged and been in the growing demand.

Sports science is an emerging discipline which applies scientific principles to understand the factors associated with the sporting performance, health and well-being of an athlete. These are integrated support teams which include sports medicine, physiotherapy, exercise physiology, sports psychology and nutrition experts. Their work is athlete centric and coaches driven to ensure competitive success. This is achieved through:

- Physical fitness enhancement
- Maintenance of health
- Treatment of injuries
- Rehabilitation from injury
- Prevention of injuries and overtraining
- Recovery and regeneration

Researcher being Āyurveda Physician working in the professional sports field has closely observed that the present scenario of sports sciences and medicine is more focused on curative and injury management approach than the preventive one. As fitness and sports performance are the outcome of biological rhythm, which include harmony of physical, mental and intellectual

abilities altogether. Hence there is a need of holistic approach to the overall sports sciences activities.

In Sanskrit literature, the concept of Balopāsanā is described in a very holistic way. Its aim is union with divine i.e. mokṣa, but the path leading towards this includes the journey of development of physical, mental, intellectual and spiritual abilities. Hence researcher feels that exploration of the concept of Balopāsanā from Sanskrit literature will be able to give the holistic approach to present sports sciences.

Why this Study?

Researcher has also observed the evidences of application of Āyurvedic medicines for improvement of Bala and treatment of war injuries in classical texts of Vedas and Āyurveda. Similarly, it has been observed that there is a strong link between concept of Balopāsanā, vyāyāma and Āyurveda in Sanskrit literature. Researcher is curious to explore this link and study its relevance with present sports sciences.

Aim of the Study:

This study is aimed towards exploration of concept of Balopāsanā to the present relevance of Krīḍāvaidyaka (sports medicine).

Researcher aims to develop an evidence-based module of Krīḍāvaidyaka based on exploration of the concept of Balopāsanā in Sanskrit literature.

Objectives of the study:

1. To study the various contexts of concept of Balopāsanā in Sanskrit literature
2. To explore the evolution of the concept of Balopāsanā with the context of time, need and application
3. To explore the link between Balopāsanā, Vyāyāma, and Āyurveda in Sanskrit literature with special reference/ relevance with the need of present sports and fitness field
4. To define Balopāsanā with special reference to Krīḍāvaidyaka
5. To design the module of Balopāsanā consisting of
 - 5.1 Assessment of Bala
 - 5.2 Holistic Balopāsanā module for sports persons
 - 5.3 Assessment of vyāyāmaja Balakṣaya of a sports person

6. To study the practical applicability of the Balopāsanā module

Hypothesis of the study:

An exploration of the concept of Balopāsanā from Sanskrit literature will be relevant present Krīḍāvaidyaka (sports medicine)

Scope of the study:

- Scope of this study includes study of concept of Balopāsanā in Sanskrit literature
- Scope of Sanskrit literature includes Vedic literature, Ayurvedic literature and literature on Yoga-shastra
- Scope of concept of Balopāsanā includes prevalence of physical and mental aspects
- Scope of concept Krīḍāvaidyaka includes current practices of sports sciences and sports medicine

Limitations of the study:

- Spiritual aspects of concept of Balopāsanā will not be discussed in detail
- Lalit Sanskrit literature on Nāṭya, Kāvya, Sangīta will not be included in the scope of the Sanskrit literature

Significance of the study:

- This study will be pioneering attempt of an interdisciplinary study in Sanskrit literature and sports
- This study will explain the holistic concept of fitness
- This study will give rise to concept of Krīḍāvaidyaka
- Present study will give evidence-based modules of Balopāsanā which can be used by fitness professionals.

Chapter 2

Review of Literature

Review of literature of this study is directed towards understanding the concept of Balopāsanā in Sanskrit literature to the present relevance of sports medicine.

Sanskrit literature is very vast and versatile. It can be divided as Vaidika literature, it includes four Vedas, their respective brāmhaṇa, āraṇyaka, Upaniṣads, and six vedāṅgas. Post Vaidika literature includes epics-Rāmāyaṇa and Mahābhārata, Darśana Sāhitya including Jaina Darśana, Bauddha Darśana, Saṃkhya Darśana, Yoga Darśana and Purāṇas. Further Sanskrit literature on śāstra is available on Vyākaraṇa, Jyotiśa śāstra, Dharma śāstra, Āyurveda śāstra, Saṃgīta śāstra. Various Dramas, (Nātakas) and Kāvya (Poetries) also comprise to Sanskrit literature.

This reveals the variety of forms and subjects in Sanskrit literature. It is merely herculean task to cover entire Sanskrit literature for review. Hence for the context of present study, researcher has limited review of Sanskrit literature to Vaidika literature involving four vedas and Upaniṣads and other literature including Epics, Darśana, Purāṇas and Āyurveda śāstra.

Review of literature is grossly subject wise however internal chronological order of references is followed.

Methodology of Review of Literature

Materials used: Primary Sources.

For the review of literature of present study available texts of Vedas, Upaniṣads, Rāmāyaṇa, Mahābhārata, Pātañjali Yoga sūtra are used. Review of Āyurveda literature is done extensively from Bṛhat trayī of Āyurveda i.e. Caraka Saṃhitā, Suśruta saṃhitā, AṣṭāṅgaSaṅgraha a and Laghu trayī, Mādhavanidāna, Bhāvaprakāśa and Śārṅgadhara Saṃhitā.

Secondary Sources:

It includes all other related literature on the concept of Balopāsanā. It includes compilations of information called Vyāyāma jñānakośas, Kriḍā jñānakośas, books on Āyurveda. Yoga, Sports Medicine, physical education.

Research literature including published, unpublished Ph. D thesis, Master's thesis and research articles on the concept of vyāyāma, Bala, Āyurveda are reviewed.

For understanding the need of holistic sports medicine module, research literature on sports medicine is extensively reviewed.

Keywords Used:

While performing review of literature keywords are used. It includes Bala, Upāsana, Vyāyāma, Āyurveda, sports medicine, Kṛīḍāvaidyaka.

ROL of this study is directed towards understanding the chronological evolvement of concept of Balopāsana since Vaidika period/ pre-historic period and understanding its relevance with present context of Kṛīḍāvaidyaka.

Scope of ROL:

Vaidika literature:

Veda means knowledge. It is foremost scriptures in the heritage of Sanskrit literature. It discusses almost everything about human life. Hence it is included in the review of literature of this study, Vaidika literature includes four Vedas, it's brāhmaṇas, āraṇyakās, Upaniṣads and Upavedas. It includes knowledge on dharma, culture, sociology, politics, finance Religion, karmas and philosophy.

Review of Vaidika Sanskrit Literature includes four Vedas, Upaniṣads and upavedas including Dhanurveda and Āyurveda. Various contexts of the concept of Bala are observed in Vaidika literature. Earlier references of Balopāsana observed in Ṛgveda and Chāṇḍogya Upaniṣad. Vaidika literature includes veda saṁhitā, brāhmaṇa grantha, āraṇyaka and Upaniṣads.

Vaidika saṁhitā include basic knowledge of life. brāhmaṇa grantha include Rituals and expand on their meaning and it includes information about yajna and yāgā. Āraṇyaka Grantha include information about forest treaties were composed by people who meditated in the woods as seclude and are third part of Vedas. The texts contain discussions and interpretations of ceremonies from ritualistic to symbolic materialistic point of view. Hence brāhmaṇa grantha are not covered under ROL of this study.

Upaniṣads:

They from the last part of Vaidika literature it elaborates on Brahmavidyā. Upaniṣads interpreted and discuss the philosophy of saṁhitā in metaphorical ways and explore the abstract concept like Ātmān. They show the evolution of ideas from actual sacrifice to symbolic sacrifice. Ādi Śankarācārya has classified Vedas into karma kāṇḍa (Action / ritual related sections) and jñāna kāṇḍa (knowledge related section).

To understand the philosophical aspect of concept of Balopāsana from Vaidika literature including Vedas, Upaniṣads are included in the ROL of this study.

Rāmāyaṇa, Mahābhārata:

Rāmāyaṇa, Mahābhārata comprise epics of Sanskrit literature. They are reviewed for this study with its special relevance of concept of Balopāsanā. It was purposed for wars during this time.

Dhanurveda:

Dhanurveda is Upaveda. It is dedicated for war techniques. To understand the concept physical exercise for these war excellence Dhanurveda is studied under ROL of this study.

Āyurveda:

Āyurveda is the science of life. It is upaveda of Atharvaveda. In Āyurveda texts knowledge of about life is compiled. It is primarily directed towards healthy long life and then towards treatment of diseases.

The concept of Bala is discussed in detail in Āyurveda. It's physical, physiological attributes, types, measures to enhance Bala, reasons of decrements and diseases are described in detail.

Methods of assessment of Bala is in terms of capacity of exercise. various measures to enhance Bala through diet lifestyle and treatments are described. Direct linking Between Bala, Vyāyāma is observed in Āyurveda texts. Vyāyāma is considered as part of daily routine for healthy long life and as a treatment module of Various diseases too. Health benefits of Vyāyāma, effects of excessive Vyāyāma and its treatment and effects of non-practice of vyāyāma are discussed in detail in Āyurveda texts.

Thus, to understand the health-related aspect of Bala and for exploration of concept of Balopāsanā including vyāyāma, lifestyle, and Āyurveda 's treatments, Sanskrit literature on Āyurveda is extensively reviewed for this study.

Literature of Āyurveda is also very vast. For the present study Bṛhat trayī including Caraka Saṁhitā, Suśruta saṁhitā, AṣṭāṅgaSaṅgraha and Laghu trayī including Śārṅgadhara saṁhitā, Mādhavanidāna and Bhāvaprakāśa Saṁhitā are covered for ROL of this study. Since these saṁhitā encompass all the aspects of Āyurveda.

Literature on Yoga:

Yoga is one of the six orthodox systems of Indian philosophy. It was collated, coordinated and systematized by Patañjali. In Indian philosophy, everything is permeated by the supreme Universal spirit (Paramātmā) of which every individual spirit (jīvātmā) is a part. The system of Yoga is so called because, it teaches how the jīvātmā can be united with Paramātmā and to secure liberation (mokṣa).

Yoga is the yoking of all the powers of body, mind and soul. It means disciplining of the body, the mind the intellect and emotions. Yoga teaches the soul to look at all the aspects of life evenly for example joy and sorrow.

In Bhagavad-Gītā, karma Yoga is described (Yoga by actions) working sincerely abandoning selfish desire sincerely. Yoga is described as wisdom in work of skillful living amongst activities, harmony and moderation without getting affected by success or Failure. This Equipoise is called is Yoga.

This philosophy is useful in every aspect of life. In this study application of Yogic principles and its relevance with present Kṛīḍāvaidyaka is focused. As discussed earlier sports performance is outcome of perfect biological rhythm. Though, it appears as an expression of maximal physical abilities, it is an outcome of the harmony of physical mental, emotional and intellectual abilities. To explore this link, literature on Yoga is included in ROL of this study. It will cover Patañjali Yoga sūtra, Bhagavad- Gītā. Secondary sources and commentaries on Yoga sūtra and research literature on application of Yoga in sports is also included in ROL of this study.

Balopāsanā during Vaidika Period:

Vedamaṅtra reveals different words of meaning Bala (strength/power). It shows that the word Bala was being used in various contexts during Vaidika period.

In Nighaṅṭu Vaidika Kośa chapter 2, part 9 gives 28 words which reveals different types of Bala. These words are compiled from Vedas. We will study all these names and its contexts which will lead towards understanding the concept of Balopāsanā thoroughly.

Table 1: List of words revealing different types of bala compiled from Vedās

Word	Meaning	Reference /relevance in Vedas
1. Paum̐syāni	Pauruśa	It is used in Vedas to describe power of various deities like Indra etc.
2. Vīrū	Bravery	This word is used to

		describe Bravery in Vedamaṅtra.
3. Sahah	Capacity to sustain or maintain	This means to ability to sustain. It is referred in context of wars, this is ability to sustain or maintain own position in strenuous attack from opponents.
4. Badhah/Bādhah/vadhah	To trouble/ nuisance	This is referred in context of war techniques. It is the ability to trouble opponent in various ways, not only in terms of overpowering in strength but also other ways too.
5. Vrujanam/vruka/varga	Miseries or mislead	To mislead/deceive opponent This is one of was technique to be used against mighty opponent
6. caustnyam/cyāvanam	To fall or to move	This means to fall down/defeat opponent or to move opponent from his place.
7. Draviṇam	Wealth	It is strength in terms of wealth is one meaning and another meaning is strength, ability or willpower.
8. Majmanā	Purity	This is referred as purity of mind, body, senses.

9. Dharaṇasi	To hold, sustain to bring together.	This is ability to hold people together. This requires physical ability and other leadership qualities too.
10. Śaṃbaram/Śaṃbati	Strength of a group (clouds)	Strength of union of a group. Another meaning of śaṃbar is cloud. The way clouds pour everything for earth, the ability of sacrifice or selflessness in another meaning of śaṃbar
11. Spandrasa	Strength/power of speed.	The power generated from speedy action or speedy medium
12. Yahah	Speed	Speed
13. Śavah	Speed	Speed
14. Tarah	Quickness agility	This is quickness of actions
15. Śardhah/Śardhate	Power of growth	This is power of growth in terms of age, thought, actions, group.
16. Tavah/ taviṣī	Power of authority	This is power of Authority. It is one of the quality of leadership.
17. Nruṃnam	Power of Humanity	This is psychological ability. It means ability of humanity with power

		created by goodness of actions.
18. Śūṣṇam/Śūṣah	Power of anger (ऋक्)	This is a quality of leadership. Power of anger, enthusiasm, motivating others with strong words/actions.
19. Oja	Physical strength	It's essence of all body constituents. According to Āyurveda, it is the indicator of physical strength.
20. Dakṣa	Agility/Reaction time efficiency	It's a psychosomatic skill to utilize physical strength efficiently.
21. Vāja	Physical strength	It's outcome of healthy seven basic body constituents called as vīrya.
22. Tvaja	Physical strength	It means being lean but strong it depicts the agility of movement because of all body constituents in healthy state. It's referred as sārata in Āyurveda.

Out of these words following words reflect meaning physical strength. oja, Dakṣa, Vāja, Pāja, tvakṣa these are words which reflects the physical strength. Spandrāsa, Yaha, Śava, Tara these are power generated with speed and peaceful actions, śardha reveals power of growth which can be considered as (Kālaja) Bala. Rest of the words are related with war and abilities of leader/king.

These words are found in Vedas to describe powers of deities and war techniques which were used in wars between deities and evils (deva with dasya/asura). This reveals there were various aspects of concept of Bala in Vaidika period. They include war abilities, physical strength and leadership abilities, psychological and spiritual abilities.

It allows that all these contexts aspects of Bala were worshiped in Vaidika period in various ways. As the focus of this study is related with physical strength, we will further explore it in detail.

Physical Strength and brāmhajñāna:

Prayer of for Bala.

During Vaidika era physical strength is also worshiped. There are verses in Vedas which give evidences of praying Paramātmā for physical Bala some of these are as follows:

ऋ१०/१०१/२, अथर्व. 4/2/1

Here in this verse of Ṛgveda, Paramātmā is considered as reason of Bala and worshiped for Bala. This establishes the link between physical strength, Ātmā and Paramātmā. This shows worship of Paramātmā was earliest state since Vaidika age.

ऋ३/५३/ १८

In this verse of Ṛgveda, Lord Indra is worshiped and requested for giving physical strength to kids and cattle's. Lord Indra is considered as bearer of all strength. This reveals physical strength was as prime part of worship during Vaidika period.

Vaidika Prayers for Bala:

Prayers are the ways to express feelings or aspirations. Prayers for Balopāsanā are observed in Vedas

तेजोडसि तेजो मयि धेहि, वीर्यमसि वीर्य मयि धेहि बलमसि बलं मयि धेहि, ओजोस्योजो मयि धेहि, मन्युरसि मन्युं मयि धेहि, सहोडसि सहो मयि धेहि।

वा.य 19:9

In this verse, Paramātmā is praised of bearing Teja (energy) Vīrya (vitality, enthusiasm, essence of all body constituents) Bala (Strength Force) Oja (Vigor) Manyu (Mental strength) Saha (Tolerance) and requested to bless me with these qualities. This shows urge of strength in Vaidika period.

बाहु मे बलिमिन्द्रियं हस्तौ मे कर्म वीर्यम् ।

वा.य २०/७

Let my arms be token of strength. Let my hands and work done by hands be symbol of vigor. In this way strength should be concentrated in my work and in my arms. It shows the urge of having strong body and channelizing strength in work.

बहु बाहवोर्बलं, उर्वोरोजो, जंघयोर्जवः पादयोः प्रतिष्ठा ।

अथर्व १९:६०:१

Let my hands be strong, my thighs should possess strength, my legs should have speed and my feet should be strong and able to bear all the body weight and actions.

From the Precision in this prayer it can be inferred that, during Vaidika time there might be specific practices for strengthening of every organ. Thus, people were not only longing for gross strength, but specific action-oriented abilities were also pursued.

In R̥gveda powers of various deities is described in detail. It gives the different contexts of concept of Bala during Vaidika period.

1) Lord Marut:

मरुतो यध्व वो बलं जनां अच्युच्यवीतन ।

ऋ १:३७:१२

It means Lord Marut (Vāyu/ wind) has the great capability of moving mighty opponent from its root. No-one could stand the speedy force of Lord Marut (Vāyu).

It explains the strength of speedy actions.

ऋष्टयो मरुतो अंसयोरधि सह ओजो बाहवोर्वो बलं हितम् ।

ऋ.५.५७.६

Lord Marut was acquainted with strong shoulders having quiver and his arms are having great strength.

In praises of Lord Marut the word घोसपर्वस is mentioned, which means having big strong body.

2) Lord Indra:

Lord Indra's strength is praised in various ways describing his physical attributes and bravery in R̥gveda. Some evident verses are as follows:

महत्त इन्द्र वीर्यं बाहवोस्ते बलं हितमर्चन्ननु स्वराज्यम् ।

ऋ.१.८०.८

“Lord Indra, was daring warrior whose hands possess great strength with which his empire was spread in all directions.

बलाविज्ञायःस्थविरः प्रवीरः सहस्वान्वाजी सहमान उग्रः अभिवीरो अभिसत्वा सहोजा जैत्रमिन्द्र रथमातिष्ठ गोवित ॥

ऋ.१०/१०३/५

Qualities of Lord Indra are described in this verse. He is praised as strong, stable, possessing great valor, capable of defeating / conquering opponents, brave warrior, Indra who was having a lot of followers.

There are many verses in Vedas where strength of lord Indra is praised some of them are as follows.

भुरि त इन्द्रवीर्यम् ।

ऋ.१/५७/५

Lord Indra's is having a lot of vitality.

इन्द्रस्य तु वीर्याणि प्रवोचम् ।

ऋ.१/३२/१

भुरीन्द्रस्य वीर्यं व्यख्यमभ्यायति ।

ऋ.८/५५/१

विश्वे त इन्द्र वीर्यं देवा अनुकृतुं ददुः।

ऋ.८/६२/७

इन्द्रस्य वज्र आयसो निमिश्ल इन्द्रस्य बाहोभूयिष्ठमोजः ।

ऋ.८/९६/३

गोत्रभिदं गोविंदं वज्रबाहुं (इंद्रम्)

Here in these sutras strengths of lord Indra's hands and arms are described. It is praised that Indra was having rock strong arms.

महत्तदस्य पोस्यं वृत्रं जधन्वान ।

ऋ.१/८०/१०

Lord Indra was having great courage. Thus, all descriptions are suggestive that physical strength was extensively discussed and worshiped in Vaidika period.

All these references are suggestive of big, strong, able, brave, physical attributes of Vaidika deities like lord Marut, lord Indra etc. All these were warrior deities. This is indicative of existing worship of physical strength during Vaidika period. Prayers of upāsaka reveal aspirations of strength alike deities and include requests to offer same physical strength for himself. Naturally there would have been efforts to attain physical strength like deities. This is indicative of strong urge of physical strength in Vaidika period. Thus, we can infer that Balopāsana was existing in Vaidika period.

Sports and Exercises in Vaidika Period:

As we get reference of Balopāsana during Vaidika period, there must be various methods to nurture physical strength which needs to be studied.

Methods of Balopāsana are not directly described in texts of Vedas. But there are references Archery, fencing, boxing, horse, riding. These were referred as physical exercises.

Though the direct reference of exercises to attain physical strength are not directly observed in Vedas. But Dhanurveda gives references of archery, war techniques, Fencing, boxing etc.

In Vaidika texts some activities were specifically mentioned for physical strength they are as follows:

१ मृगया (Hunting)

First occupation giving physical exercise was animal hunting.

मृगयुभ्यश्च वो नमः।

वा.च. १६/२७

Those who do hunting were prayed. Those who do hunting were supposed to be Rudra's incarnations and worshiped. They were considered courageous and prayed.

Hunting was followed as occupation by kṣudrā and Kṣatriyā and it was pursued as sports by others.

Hunting was considered as a great exercise as it needed physical strength, courage, endurance. It creates strong muscles and endurance.

2. Horse Riding (अश्वारोहण)

Horse riding was considered as one of the sport and exercise in Vaidika period. Horse rider was called as Aśvasād or sādī. It was also considered as occupation in Vaidika period. Having horses

along with other cattle was one of social standards. There are some Vaidika verses where horses are praised like deities.

अनु त्वा रथो, अनुमर्यो अर्वन्ननुगावोडनु भगः कनीनाम, अनुवातासस्तव सख्यमीयुरनु देवा ममिरे वीर्यं ते
हिरण्यशृंगोडयो अस्य पादा मनोजवा अवर इन्दे आसीत देवा इदस्य हविरदमायन्यो अर्वन्तं प्रथमो अध्यतिष्ठत ..९...

ऋ १/१६३

This means carts follow horses, horses are praised by gods and bring social standards to the owners. Horses are considered to have golden horns; his legs are iron strong, and horse's speed is greater than lord Indra. Hence, they are praised by Gods too.

During Vaidika period Horse riding races were, existed, they were called as आजी, आशु, अत्य
आजि न जम्मुर्गिवीहो अश्वा ।

ऋ ६/२४/६

पुरो यावानमाजिषु ।

ऋ ५/३५/७

Thus, horse riding was pursued as sports, exercise and occupation during Vaidika period. Riding was one of war force and specific exercise were pursued by them.

Dance:

Nṛtya was famous in Vaidika period in various ways as a form of exercise, sport and entertainment e.g. dancing on rope which was called as Vaṅshnatti. (वा. य. ३०/२१) In R̥gveda stances of sword, (Khadga) were described as the form of dance.

आजावद्भि वावसानस्य नर्तयन् ।

This means, brave warrior takes his sword (khadga) to dance. It means he moves his sword so swiftly and rhythmically, so it appears like dance of sword. There might be forms of dance where weapons were carried during dance.

हसो नरिष्ठा नृत्तानि शरीरमनुप्रविशन् ।

अथर्व . ११/१०/२४

Laughter, outdoor sports and dance were acquired by body. This means during Vaidika period dance was performed in various forms using weapon or props. It has been mentioned that along with outdoor sports dance is a form of exercise during Vaidika period.

प्राञ्चो अगाम नृतये हसाय द्राघीय आयुः प्रतरं दधानाः ।

ऋ १०/१८/३

In this sūkta from Ṛgveda, laughter and dance are related with long life. Thus, dance is referred in various forms in Vaidika period as sports, exercise and entertainment too. Health benefits of dance are also studied.

३. खननम् (Digging)

Digging was considered as strength enhancing activity during Vaidika period.

अगस्त्यः खनमानः खनित्रैः प्रजामपत्यं बलमिच्छमानः।

ऋ १/१७९/६

Agastya Ṛṣī used to do digging to improve strength

४. मुष्टियुद्ध (Boxing)

Boxing is referred as was technique, since Vaidika period. It was considered that the best warrior is one who is the best at boxing. Boxing was considered as the most important and ultimate form of fighting.

Some of the verses from Vedas where boxing is referred are as follows:

नि येन मुष्टिहत्यया नि वृत्रा ऊणधामहै।

ऋ १/८/२

अथर्व २०/७०/१८

साहा ये सन्ति मुष्टिः एव हव्यो विश्वासुवृत्सु।

ऋ ८/२०

युष्मदेति मुष्टिहा बाहुजूतो युष्मत्सदश्वो मरुतः सुवीरः।

ऋ ५/५८/४

शकाश्नरस्य मुष्टिहा पुनरेतु महावृषान।

अथर्व ५/२२/४

In these sukta boxers are considered as the best worriers in all war forces. Lord Marut is worshiped for blessing boxer and horse rider to save worries son. This shows the aspiration of being the best boxer. Naturally it must be pursued systematically during that time. Further vegetarian boxer is considered best as a brave boxer. It indicates that food was considered important in training of boxing.

Thus, hunting, horse-riding, dance, digging and boxing were observed as form of physical exercise to enhance physical strength during Vaidika period. One common thing is also observed in all these forms of physical exercises i.e. They were also performed as occupation for living and most of these skills were required in war force. It reveals the contemporary need of physical fitness and exercising.

Use of medicines to Enhance Bala:

There are some references in Vedas where use of medicinal herb is suggested for enhancing Bala. These Various are as follows:

इमां खनाम्योषधिं वीरुधं बलवत्तमाम् ।

ऋ १०/१४५/१

अ ३/१८/१

This medicine is good for enhancing strength hence we are digging it out.

या औषधी सोमराज्ञीर्विष्टिता पृथिवीमनु ।

बृहस्पति प्रसूता अस्यै संघत्ते वीर्यम्

सर्वाः संगत्य वीरुधोडस्यै संदत्त वीर्यम् ॥

यजु १२/९४

In Atharvaveda rational behind pursuing Bala is explained as follows:

को अस्य बाहू समभरद्वीर्यकरवादिति ।

अथर्व १०/१/५

बलं को अस्मै प्रायच्छत्को अस्या कल्पयज्जवम् ।

अथर्व १०/२/१५

How strength of arms can be increased what one should do to improve power and speed of actions. It reveals the aspiration of attaining power.

By application of medicinal herbs and exercise 33 types of vīrya (Vitality) can be achieved. Physical strength is one of the attribute of these 33 vīrya which can be achieved through use of Soma and other medicinal herbs:

भर्गो यशः सह ओजो वयो बलम् त्रयस्त्रिंशदयानि वीर्याणि ।

अथर्व १९/३७/१

आजश्व तेजश्व सहश्व बलं च वाक्चेन्द्रियं च श्रीश्व धर्मश्च ब्रम्ह च क्षत्रं च राष्ट्रं च विशश्च त्विषिश्च यशश्च वर्चश्च द्रविणं च ।

आयुश्च रूपं च नाम च कीर्तिश्च प्राणाशवापानश्च चक्षुश्च श्रोत्रं च पयश्च रसश्चान्नं चान्नाद्यं चर्तथ सत्यं चेष्टं च पूर्तं च प्रजा च पशवश्च ।

अथर्व १२/६७/१०

These are 33 vīrya enlisted in Atharvaveda. It refers to physical, mental, social, intellectual abilities of a person. Out of these sports related attributes can be enlisted as follows:

सामर्थ्य	:	capacity
तेज	:	Valor, spirit, gallantry
सह	:	Tolerance capacity

बल	:	Strength, power
वक्तृत्व	:	Loud, elocution
इंद्रियशक्ती	:	Ability of All sensory organs
शौर्य	:	Bravery
उत्साह	:	Enthusiasm
आयुः	:	Long life.
रूपं	:	Good physical appearance
नाम, किर्ती	:	fame
प्राण,अपान	:	Breathing ability
चक्षु श्रोत्र	:	sharp ear and eyesight

In this way linking between Bala and use of medicinal herbs is found in Vaidika literature.

Balopāsanā in Upaniṣads

Vaidika literature starts from Vedas and concludes with Upaniṣads. Upaniṣads mainly deal with jñāna (knowledge) part of Vedas. As it comprises last part of Vaidika literature Upaniṣads are called vedānta. Paramātmā (soul, self), brāhmaṇa (supreme soul) and mokṣa (liberty) is the central concept discussed in Upaniṣads. The concept of Bala and Balopāsanā is also observed in Upaniṣads as follows:

Chāndogya upniṣad gives reference of importance of power over knowledge and its role in brahmahrāptī. It is explained as follows:

बलं वाव विज्ञानाद्भूयोऽपि ह शतं विज्ञानवतामेको बलवानाकंपयते, स यदा बली भवायथोत्थाता भवत्युत्तिष्ठन्परि चरिता भवति, परिचरन्नुपसत्ता भवत्युपसीदन्द्रष्टा भवति, श्रोता भवति, मन्ता भवति, बोध्दा भवति, कर्ता भवति, विज्ञाता भवति। बलेन वै पृथिवी तिष्ठति बलेनान्तरिक्षं बलेन द्यौर्बलेन पर्वता बलेन देवमनुष्या बलेन पशवश्च वयांसि तृणवनस्पतयः श्वापदान्याकीटपतङ्गपिपीलिकं बलेन लोकस्तिष्ठति बलमुपास्वेति ।

स यो बलं बह्वैत्युपास्ते यावत् बलस्य गतं तत्रास्य यथाकामचारो भवति यो बलं बह्वैत्युपास्ते ॥ २ ॥

छां.उ. ७/८

नायमात्मा बलहीनेन लभ्यः ॥

मुं.उ. ३/२/४

Śāṅkara Bhāṣya: P 184-184

Power is greater than knowledge. A single man with power shakes hundred men with knowledge. When a man has power, he rises, rising he serves, serving he approaches nearer,

approaching nearer he sees, hears, reflects, understands, acts and knows. It is by power that the Earth stands, by power the sky, by power the heaven, by power the mountains, by power the Gods and Men, by power the cattle the birds, grasses and trees, the beasts down to ants and worms and by power does the world stand. Hence, Meditate upon the power.

One who meditates upon the power as bramhan, becomes independent so far as power reaches- one who meditates upon power as bramhan, Is there anything greater than power? Tell that to me Sir.

In this way greatness of power is explained and in next verse it is stated that power is born of the food hence food is greater than power.

Since for bramhaprāptī one must follow strict rituals which cannot be completed by physical weaker or diseased person. Thus, for spiritual development and for journey to towards liberty physical strength power is mandatory.

Further in Chāṇḍogya upniśad connection of power with self or spirit (Ātmā) is explained as follows:

आत्मातो बलम् ॥

छां. ३. ७/२६/१

Power spring from the self (Ātmā). Hence for the expression of power generated from the self, one needs strong physical body which is nurtured from food. In the physical body Prāṇa is the seat of Bala which connects physical body with the self (Ātmā).

प्राणो वै बलम् ।

बृ. ३. ५/१४/४

अतो यान्यन्यानि वीर्यवन्ति कर्माणि यथाब्जेर्मन्थनमाजेः सरणं दृढस्य धनुष आयमानमप्राणन्नपानस्तानि करोति ।

छां. ३. १/३/५

Therefore, whatever actions that require strength such as rubbing out of fire, running over a boundary (Barrier), stringing a strong bow all are performed while one is neither breathing out not breathing in therefore one ought to meditate upon vyāna as the udgīta (center of meditation).

Commentary: Not only the utterance of speech, but action besides this that require extra strength and effort to accomplish are performed by vyāna. Hence one should meditate upon vyāna.

In this way physical connection of power, Ātmā, Prāṇa, vyāna is established in upniśad. Further in Yoga and Āyurveda, it is explained more vividly including techniques of Prāṇāyāma in yoga and Āyurveda. That will be discussed in detail in later part of this study. While narrating the importance of power it is described in Taittirīya upniśad.

Youth who aspires to attain Brahma jñāna should be optimistic, healthy and strong.

Thus, in this way the concept of Bala (Power) is discussed in Vedas and Upaniṣads. It includes the physical and spiritual context of the concept. The physical aspect of Bala (power) mainly related with bravery, war techniques, occupation and entertainment whereas spiritual aspect of Bala is related with journey of self-realization (Ātmā jñāna) and Bramhaprāptī,

The link between physical and spiritual aspect of Bala is well established in Vaidika literature prāṇa, vyāna, apāna are the seat of power and connecting link between gross body and subtle body (mind, Ātmā and intellect). This union between gross body and subtle body leads the path of self-realization, Brahmajñāna and Bramhaprāptī i.e. Liberation.

Thus, Vaidika literature gives holistic of philosophical base of concept of Balopāsanā which is further elaborated in Yoga and Āyurveda. The concept of Balopāsanā will be explored in the next chapters of this study which is based on philosophy guided by Vaidika literature.

Concept of Upāsanā in Upaniṣads :

उपासनं तु यथाशास्त्रसमर्पितम् किञ्चित् आलम्बनं उपादायं तस्मिन् समानचित्तावृत्तिसन्तानकारणम् ।

छां. उ. १

वेदोपास्ते तु यस्त्वेताः फलं तस्येदमुच्यते शास्त्रार्पिताधियोपेत्य ह्यातादात्म्यभिमानतः । चिरासनं भवेदर्थे तदुपासनमुच्यते ।

तै.उ. १/३/६६

Upāsanā is the central idea of Upaniṣads where various types have been described. Upāsanā is the bridge between jñāna and karma. It is a single act of thought or frequent repetition of one thought conducted by directing mind towards self which leads to supreme self.

In C.U. commentary it is explained that Upāsanā is the process where in a slow and gradual gliding from thick gross outer world to thinnest inner most subtle world is experienced by Upāsaka.

In C.U. it is explained that one who derives to have strength in action should meditate on Vyāna which is superior. In Dinakarācārya comment, it is stated that It is better to meditate upon the superior because it brings about superior results. For this reason, one ought to meditate upon Vyāna as the udgīta, the result which would be vigorous actions.

This is one of the earliest references of Balopāsanā in Vaidika literature. This link of Balopāsanā from Vaidika Literature which includes exercise, food and use of medicinal herbs and Upāsanā

of Omkar will be explored in this study. Based on the philosophy from Vedas practically relevant module of Balopāsana for present Krīḍāvaidyaka (sports medicine) will be prepared.

Balopāsana in Rāmāyana and Mahābhārata:

Rāmāyana is the first epic in Sanskrit Literature. The period between approximately the 6th and 1st centuries BC saw the composition and redaction of the two-great epic the Rāmāyana and the Mahābhārata.

The Authorship of Rāmāyana is attributed to vālmikī who is referred as Ādikavī. The story deals with the prince Rāma his exile, and the abduction of his wife by the Rākṣasa king Rāvaṇa and the Lankan war. The society culture was religious. Based on symbolic evidences of strength of Rāma, Hanumān, Laxman, Sugrīva, Rāvaṇa we can infer the culture of Balopāsana was existing during period of Rāmāyana, though there are very few direct references of methods of Balopāsana.

In Rāmāyana there is detailed description of war between Rāma and Rāvaṇa where personal bravery of Lord Rāma is praised, also these are some references where physical strength of Rāma is revealed they are as follows:

Defeat of Bālī and Rāvaṇa.

Gāṇḍīva Dhanuṣya (type of bow) was broken at the age 16 at the time of svayaṃvara of Sītā.

Physical characteristics of lord Rāma are described as:

विपुलांसो महाबाहु कंबुग्रीवो महाहनुः । ९॥

महोरस्को महेष्वासो गूढजन्हरिंदम ।

आजानुबाहुः सुशिराः सुललाटः सुविक्रमः ॥१०॥

समः समविभक्तांगःस्निग्धवर्णः प्रतापवान्

पीनवक्षा विशालाक्षो लक्ष्मीवाँच्छुभलक्षणः ॥११॥

रामायण प्रथम सर्ग । १

It means he was having broad shoulders, long arms touching to knees, his neck was strong like shell, chin is big. Lord Rāma possesses broad chest, which is able to take strong bow, his shoulders were well covered with muscles. He is having broad forehead. All physical features are prominent and well balanced. He was having sharp and loud voice.

These characteristics are almost similar to characteristics of sārata which is the best state of all body constituents described in Āyurveda which is a prime indicator of Bala (Power). Lord

Hanumān is second most important character in Rāmāyaṇa. Lord Hanumān is known as the god of power. Rāmāyaṇa includes many evidences of miracles of done by Hanumān and about his power. Apart from poetic exaggeration of narration there are evidence of extraordinary powers of Hanumān e.g. there is a reference of increasing is body size while crossing the sea from Mahendra mountain, this can be related with the muscular hypertrophy, which is a result of voluntary muscle control. It is practiced by body builders. There are no direct references are found in Rāmāyaṇa about physical exercises done by Hanumān. It might be because is not relevant with the story and format of the epic. But we can conclude that there must be specific exercises were followed during Rāmāyaṇa time.

In Rāmāyaṇa there are references of war between Rāma and Rāvaṇa. These wars were more of personal fights than the among the war forces. Hence Individual physical strength and war excellence are described in Rāmāyaṇa. This excellence and can be achieved with physical exercises. Hence it can be concluded that there existed dedicated Balopāsanā practices during Rāmāyaṇa period.

Balopāsanā During Mahābhārata:

The Mahābhārata is one of the Longest poetic works in the world attributed by sage Vyasa. It contains large tracts of Hindu mythology, philosophy and religion. The broad sweep of the story of the Mahābhārata chronicles the battle between the Pāṇḍavas aided by Kṛṣṇa and the Kauravas. Mahābhārata shows direct references of tradition of physical strengthening exercises (Balopāsanā) in the form of wrestling, boxing, gadāyuddha, archery, lāṭhi, javelin etc.

There are detailed descriptions of boxing between Kṛṣṇa and Balarāma Bhīma, Jarāsaṇḍha etc.

Description of wrestling battle between Bhīma Jarāsaṇḍha is as follows:

आदाय रोचनां माल्यं मांगल्यान्य पराणिच
धारयन्नगदान् मुख्यान्निर्वृत्तीर्देनानि च ।
अवमुच्य किरीटं सःकेशान् समनुगृह्णाच ।

उदतिष्ठज्जरासंधो वेलातिग इवार्णवः ॥५॥
करग्रहणपूर्वं तु कृत्वा पादाभिवन्दनम् ।
कक्षैः कक्षां विधुन्वानावास्फोटं तत्र चक्रतुः ॥
स्कंधे दौर्भ्यां समाहृत्य निहत्य च मुहुर्मुहुः ।
अंगमंगैः समाश्लिष्य पुनरास्फालनं विभो ।
चित्रहस्तादिकं कृत्वा कक्षाबंधं च चक्रतुः

गलगंडाभिघातेन सस्फुलिङ्गेन चाशनिम् ।
बाहुपाशादिकं कृत्वा पादाहतशिरावुभौ ।
उरोहस्तं ततश्चक्रे पूर्णकुम्भौ प्रयुज्यतौ ।
करसंपीडनं कृत्वां गर्जतौ वारणाविव ।
नर्दन्तौ मेघसंकाशौ बाहुप्रहरणावुभौ ॥

महाभारत पर्व २ । अध्याय २३

This is a classic example of wrestling. Along with wrestling there are vivid descriptions of Gadāyuddha, archery, horse riding fencing, elephant riding in Bhīṣmaparva of Mahābhārata. There are explanations of rules of all these war techniques. If someone hits the opponent on vital points (Marma) then attacker is not allowed to attack. That reveals there was knowledge of anatomy during that time. There are evidences of treating war injuries with ghee and medicinal herbs too.

Verses of importance of Bala in Mahābhārata:

अतिधर्माब्दलं मन्ये बलाधर्मः प्रवर्तते ।
यस्यैव बलमोजश्च स धर्मस्य प्रभुर्नरः ।

महाभारत १२/१५२/१/७

धूमो वायोरिव वशे बलं धर्मोऽनुवर्तते
अनीश्वरो बले धर्मो द्रुमे वल्लीव संश्रिता

महाभारत १२/१२४/७

सुप्रणीतो बलौधौहि कुरुते कार्यमुत्तमम् ।
अन्धं बलं जडं प्राहुः प्रणेतव्यं विचक्षणैः ॥

महाभारत २।२०/१६

It is good to have strength of a giant, but it is wicked to use as a giant.

व्यायामाल्लभते ह्यायुर्बलं वीर्यपराक्रमम् ।
शान्तिं पुष्टिं धृतिं कान्तिं चिराऽरोग्यं न संशय ॥

महाभारत

All these verses are suggestive of importance of strength and existence of tradition of physical exercise during Mahābhārata period.

References of Balopāsanā from Purānas:

This has been reviewed from secondary source of Vyāyāma jñānakośā Part 1. There are 18 Maha Purānas. Purānas were likely composed between 3rd and 10 C.E.

Purāṇas are having many references of Balopāsanā through physical exercises, various games and war techniques. Agni Purāṇa gives description of war techniques in detail. There are various types of weapons and their stances have been explained, boxing techniques, described. In Agni Purāṇa various games are also described.

आचेरुर्विधा किडा वाह्यवाहकलक्षणम् ।

यत्रारोहन्ति जे तारो वहन्ति च पराजिता ॥

भाग १०:१८/२१

The use of word “Kriḍā” for games and sports seems to be earliest one. Various games with water, ball have been described in Garuḍ Purāṇa. Games with animals like bullocks, elephant, deer, horses, included chasing fighting are described in Bhāgavat and Harivaṃś Purāṇas. Malla Kriḍā i.e. wrestling is described in detail with rules regulations for wrestlers. Qualities required to become good wrestler are described as follows,

संयमः स्थिरता शौर्यं व्यायामः सत्क्रियाबलः ।

रंगे च नयता सिद्धिरेतद्युद्धविदां मतम् ।

ह. पु. ३०:१३:१६:२१

This establishes the link between Balopāsanā and Vyāyāma. War techniques with various weapons are described it included boxing, chakra, thrones, halberd (Parśu), axe, swords, lathi, Gada etc. Description of ideal physique for wrestler was described it included Broad shoulders, strong arms and wide chest. Specific physical exercises for developing ideal physique of wrestler were performed during this time. It co-relates with voluntary muscular control and hypertrophy training in present time. Agni Purāṇa chapter 281 gives references of rules about vyāyāma as follows:

- Exercise should not be performed immediately after, eating food or drinking water and it should be avoided if there is indigestion of food.
- Massage should be done followed by vyāyāma to reduce vāta
- Very cold water should not be used for bath immediately after wrestling, lukewarm/water should be used.

It has been mentioned that, those who follow exercise are not affected by heat and cold. It refers to tolerance ability & immunity. Same references are found in Āyurveda texts. Thus, it can be inferred that Āyurveda was followed as supportive science for improving wrestling performance. It gives the evidence of existing link between Āyurveda and physical exercise or sports (Kriḍā).

Dhanurveda and Balopāsana:

The earliest records of history of warfare is found in Dhanurveda, anupaveda of Yajurveda. It deals with battle strategies, fighting methods and strategies to overcome enemies. Dhanurveda is not only a science weaponry and battle strategies but likewise all Vaidika sciences it is primarily directed for the development of full human potential including physical, mental, intellectual spiritual abilities.

In Dhanurveda gives detailed description of archery, providing qualities of good archer, strengthening exercises for archery and treatment of wounds by arrows. In Dhanurveda types of Bala are described as follows:

शारीरं हि बलं शौर्यबलं सैन्यबलं तथा ।
चतुर्थमास्त्रिकबलं पंचमं धीबलं स्मृतम् ।
षष्ठमायुर्बलं तेतैरुपेतो विष्णुदेव सः ॥ ध. वे.

There are 6 types of powers first is physical strength, second one is bravery which is mental ability, third one, war force strength in terms of weapons and people, fifth one is intellectual strength and sixth one is lifeline which is destined one.

In Dhanurveda use of medicinal herbs has been suggested to increase the strength of bow string and arrow head. There are references of using poisonous barbs on arrow head to increase its strength. It has been mentioned that steadiness of mind and body is very important for archery. To inculcate this steadiness the special practices called “śramakriyā” has been explained in Dhanurveda, which include Prāṇāyāma practices.

प्राणवायुं प्रयत्नेन बाणेन सह पूरयेत् ।
कुम्भकेन स्थिरं कृत्वा हुंकारेण विसर्जयेत् ॥

ध. वे. ११/१८३२

use of medicinal herbs for arrow/weapon injuries is mentioned in Dhanurveda

गृहीतं योगनक्षत्रैरपामार्गस्य मूलकम् ॥ १७१॥ १८८५
लेपमात्रेण वीराणां सर्वशस्त्रनिवारणम् ।
अधःपुष्पी शङ्खपुष्पी लज्जालुगिरिकर्णिका ।
नलिनी सहदेवा च पुत्रमाजीरिका तथा ।
विष्णुकान्ता च सर्वासां जटा ग्राष्यो रवेर्दिने ।
बद्धा भुजे विलेपाद्वा काये शस्त्रौधवारिका ॥ १७४॥
शुभ्रायाः शरपुङ्काया जयनीलीजटाथवा ।
भुजे शिरसि वक्त्रे च स्थिता शस्त्रनिवारिका ॥ १८१ । १८९५ ध.वे.

These references are suggestive of inclusion of medicinal herbs for practices of strengthening (Balopāsanā) during Vaidika period.

Balopāsanā in Āyurveda: Review:

Āyurveda comprises scientific part of Sanskrit literature. Āyurveda is upaveda of Atharvaveda. Tradition of Āyurveda starts from Brahma who is considered as profounder of Āyurveda. Then this tradition of knowledge of life from Brahma to prajāpatī to Aśvinī-Indra- Bhāradvāja Atreya Punarvasu- Agniveśa. Agniveśa compiled Āyurveda on the advice of Atreya which was subsequently redacted by Caraka and Drudhabala. So, from Atreya to Agniveśa and from Agniveśa to Caraka the knowledge of Āyurveda has been spread to the mankind. Caraka saṁhitā is the oldest record of medical practice in the world. Another contemporary Indian Medical practitioner was Suśruta who contributed for Āyurveda on surgery.

Āyurveda is the science of life which discusses everything that is good and bad about life. It is primarily directed towards healthy long life and then treatment of diseases since healthy body is prime base of motives of human life i.e. Dharma, Artha, Kām, and Mokṣa.

Literature of Āyurveda is widely spread. It is divided as Bṛhat Trayī including Caraka Saṁhitā, Suśruta saṁhitā and Aṣṭāṅga Saṅgraha, and Laghu trayī including Śārṅgadhara saṁhitā Mādhavanidāna and Bhāvaprakāśa.

Bala (Power /strength) is one of basic physiological attribute of health discussed in Āyurveda. Bala is the factor responsible for efficiency of a person. The concept of Bala is explained in detail including its types, assessment methods, Relation of Bala and Vyāyāma, symptoms of vyāyāmaja balakṣaya and various measure to enhance Bala through i.e. Āhāra, (Diet), Vyāyāma (exercise) and treatments including use of medicinal herbs and pañcakarmas.

With the earlier references from Vaidika literature use of medicinal measures and Āyurveda for enhancement of Bala, researcher has extensively reviewed concept of Balopāsanā from Āyurveda literature to design with Balopāsanā module which will be relevant to present need of Kṛīḍāvaidyaka (sports medicine). This idea of exploration is based on method of extension of Anukta (unexplored concepts) given in Āyurveda.

Based on review of concept of Bala in Āyurveda, the module of Balopāsanā is developed. Methodology of this exploration will be explained in next chapter of this study.

Table 2: Literature Survey of Āyurveda on concept of Bala:

Concept	Reference from Āyurveda
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1. Bala Definition	Suśruta saṁhitā su. 15 Caraka Saṁhitā Sutra 17
2. Vyāyāma	Caraka Su. 7,
3. Vyāyāma Benefits	च.सू.७/३२ सु.चि:२४/३९ वा. सू. २/१०
4. Ardhaśaktī Vyāyāma	सु.चि. २४ वा.सू. २/११
5. Effects of excessive Vyāyāma	सु.चि. २४ वा.सू. २ च.सू.७
6. Types of Bala	च.सू.११/१६ अ.सं.शा ८/३०
7. Characters of Balvān	च.सू. २१/१८:१९ सु.सू. १५
८. बलपरीक्षण	च.वि. ४, च.वि.८ सु.सू. १ सु.सू.३५ सु.सू. अ.सं.शा ८
9. बलवृद्धीकर भाव	च.शा. अ. ६। अ.सं.शा ८
10- शारीरवृद्धि कर भाव	च.शा.६। च.शा. ४। सु.शा.३/४। शा.सं.प्र.खं. ४/३८
11. स्त्रोतस	शा.सू.प्र.खं. ४/३८ च.वि.५
12. शारीरक्रिया :बल	वा. सु. १ अ.सं.सू. २०

	सु. चि. २८/च.चि. १५ च. सू. २४/४
श्वसन	शा सं प्र खं ५/४८
धातु पोषण	च. चि. १५/३६
व्यायामज बलक्षय	च. सू. १७, च. सू. ७, च. चि. ८ सु. सू. १५ वा. सू. ११
बलसंवर्धन	All

Along with these primary sources, secondary sources of research studies have been reviewed to understand the present relevance of the study.

Concept of Balopāsanā in Yoga:

Yoga is one of the six orthodox systems of Indian Philosophy (Darśhan, Shastras). Though the aim of Yoga is liberation and union with supreme universal spirit, it is the journey of physical, mental, intellectual, spiritual development altogether. It is the path of eight steps which leads the gradual development of soul. These eight steps comprise of 1) Yama 2) Niyama 3) Āsana 4) Prāṇāyāma 5) Pratyāhāra 6) Dhāraṇa 7) Dhyāna 8) Samādhi

- | | |
|---------------|--|
| 1) Yama = | Universal moral commandments. |
| 2)Niyama= | Self-purification by discipline |
| 3)Āsana= | Postures. |
| 4)Prāṇāyāma= | Rhythmic control of the breath. |
| 5)Pratyāhāra= | Withdrawal of mind from dominating of the senses and exterior objects. |
| 6)Dhāraṇa= | Concentration |
| 7)Dhyāna= | Meditation |
| 8)Samādhi = | A state of super consciousness. |

Out of these eight steps first five steps are called Bahiraṅga Yoga which and last three steps of Dhāraṇa Dhyāna, Samādhi are called Aṃtaraṅga Yoga which take the Yogi into the innermost recesses of his soul. Yama, Niyama are meant to control the passions and emotions and keep him

in harmony with his fellow man. Āsanas keep the body healthy and strong thus help to bring the consciousness and control over body. It renders a fit vehicle for the soul.

The next two stages Prāṇāyāma and Pratyāhāra lead to regulate breathing and to controlling the urges of senses. Thereby it helps to bring the mind and senses in control.

There are different paths (Marga) by which this journey of soul to supreme soul can be completed. Karma Yoga, Jñāna Yoga, Bhaktī Yoga and Rāja Yoga. It is described in Bhagvadgīta. All these paths leads are directed towards:

योगश्चित्तवृत्तिनिरोधः ।

प यो सू २

Citta vrutti are causes for the disturbances of the mind. In Yoga sutras Patañjali has given five classes of Citta vrutti which creates pain. They are 1) Pramāṇa (Perception) 2) Viparyaya (A mistaken view) 3) ViKālapa (Fancy/imagination without factual experience basis) 4) Nidrā (Sleep) 5) Smrutī (Memory) impressions of objects that has

प्रमाणविपर्ययविकल्पनिद्रास्मृतयः ॥ ६

प यो सू ६

Patañjali enumerates five causes of ciitta vrutti which is the seat of pain. These causes are as follows -

1)Avidyā- ignorance 2) Asmita (feeling of individuality which limits a person) which may be physical, mental/ intellectual) 3) Rāga (Attachment/passion) 4) Dveṣa (Aversion/Revulsion) 5) Abhiniveśa (Love/thirst of life-bodily enjoyment and fear of death)

As the breeze ruffles the surface of a lake and distorts the images reflected. In the same way Citta vrutti disturbs the peace of mind. Due to above causes Citta vrutti are created. Eight steps (Aṣṭāṅga) Yoga teaches to calm down these disturbances and stabilize the mind with Abhyāsa and Vairāgya.

अभ्यास वैराग्याभ्यां तन्निरोधः ।

प.यो.सू. २/१२

तत्र स्थितौ यत्नोऽभ्यासः ।

प.यो.सू. १/१२

स तु दीर्घकालनैरन्तर्यसत्काराडडसेवितो दृढभूमि । १४

दुष्टानुश्रविकविषयवितो दढभूमि । १४

दुष्टानुश्रविकविषयवितृष्णस्य वशीकारतंज्ञा वैराग्यम् । १५

Citta vrutti can be calmed with the help of training of constant study of eight step yoga and Vairāgya (Detachment) from desires of senses. This is the central concept of Yoga Sādhanā.

But there are some obstacles in Yoga sādhanā. They are called as citta vikshepa. They hinder the aspirant's practice of Yoga. They are as follows:

व्याधिस्त्यानसंशयप्रमादालस्याविरतिभ्रान्तिदर्शनालब्धभूमिकत्वानवस्थितनि चित्तविक्षेपास्तेऽन्तरायाः ।

प यो सू ॥३०॥

Vyādhi- Sickness that disturbs the physical equality.

Styāna- Languor or mental inertia for work.

Samśaya- Doubt/indecision.

Pramāda- Inlifferece or insensibility / carelessness

Ālasya - Laziness.

Avirati - Sensuality/inability to maintain moderation in life.

Bhranti Darśhan, - illusions, false knowledge.

Alabdha Bhumikatva : Failure to attain consistency of thought or concentration

Anavasthitattva – Instability to concentrate or instable mind. Along with these. There are four more distractions.

दुःखदौर्मनस्यङ्गमेजयत्वश्वासप्रश्वासा विक्षेपसहभुवः । प यो सू ३१

1) Duḥkha- Pain, misery 2) Daurmanasya- Despair

3) Aṅgamejayatva- Unsteadiness of body 4) śhvās praśvasa- unsteady respiration

Thus, physical health is considered important for the development of aspirant of Yoga. When the body is sick, the mind is as becomes restless and dull and concentration become impossible.

Third limb of yoga is Āsana or posture. Āsana brings steadiness, health and lightness of limbs. Āsanas not only strengthen muscles but also bring physical strengthening, steadiness and flexibility of body which comprises to concept of Balopāsanā. Further Prāṇāyāma also comprises to it by inculcating control over breath and mind too. To remove these obstacles of Vyādhi (ill health or sickness) aspirant is suggested to follow Āyurveda treatments and principles of Svasthavṛtta .

Apart from this, Yoga contributes to the concept of Balopāsanā by more holistic way.

The beauty of yoga is that, it not only warns us about the obstacles in progress towards our goal but also provides us with methodology to overcome the blocks that hinder our progress Yoga

guides us to balance our life's physical mental, emotional, intellectual, moral planes together with the philosophy niškām Karma yoga and measures of Maitrī (friendliness) Karuṇā (compassion) Muditā (delight of good work) Upekshā (feeling of disdain or contempt towards bad work)

मैत्रीकरुणामुदितोपेक्षाणां सुखदुःखपुण्यापुण्यविषयाणां भावनातश्चित्त प्रसादनम् ।

प यो सू २१

It teaches us how to maintain our inner equilibrium irrespective of external circumstances. After all pleasure and pain, success and failure, joy and sorrow, optimism and pessimism go hand in hand. A sports person knows this fact better than anyone else success and failure are like two sides of coin.

Yoga builds the mental courage to withstand failure, clarity to identify its causes and solutions to retool and retune the body and mind to overcome these shortcomings. It also prevents one from being whelmed by success.

Balopāsanā, Yoga and Sports Sciences:

A sport requires optimization of skills, strength and talent of a player. To play a single shot or stroke hundreds of muscles, joints, ligaments, nerves, mind, senses, emotions and intelligence are needed to come together in a perfect synchrony. In a team sport the complexity of synchronization is even greater. A lack of co-ordination or synchronization can lead to disastrous result in sports field. Thus, sports can be considered as art where harmony of skills, strength come together like in music.

All round or holistic fitness is required in sports. They need to withstand long hours of strenuous training, immense competitive pressure. The pressure to perform exerts physical, physiological, emotional, intellectual strain on sports persons. This may impair performance. Therefore, along with physical fitness, sport require an ability to handle these pressures.

Holistic fitness means acquiring a judicious combination of physical qualities such as strength, flexibility, endurance, speed and agility, mental characters of motivation focus, concentration and alertness, the emotional quality to withstand and be steady by in adversities and an ability to adapt to all situations and finally the temperament to be disciplined and work as a team. Ideal training regime should help each player to develop these characters.

From the primary ROL of Sanskrit literature we can conclude that, the Balopāsanā concept in Indian Philosophy is able to develop the holistic fitness characters required sports persons in

present. Balopāsanā module explored from Sanskrit literature which is based on Indian philosophy, consisting of Āyurveda and Yoga practices. This concept of Balopāsanā will be supplementary and complementary to sports persons training.

To understand the relevance of this concept with present sports field survey of research was conducted. This can be explained as further. This survey is directed towards understanding the practical applicability of this module in present sport field. It will include review of literature of sports Āyurveda and yoga researches.

History of Sports and Physical Education in India:

As we have observed the chronological evolvement of concept of Balopāsanā is introduction. It has been observed from medieval period. where foreign invasions had a great impact on sports and fitness culture in India. Till 16th century during Muslim invasions in India, the tradition of physical exercise continued in a way. Swami Samartha Ramdas established the concept of Balopāsanā to motivate youth for self-protection and protection of Hindu religion.

Further in late 16th century British Invasions started in India which brought upside down changes in Indian war techniques, military training and selection and this empire had great impact in social culture in India as well with all these the traditional Balopāsanā culture started to diminish and left for as an exhibition exposure or for entertainment. Until the spread of British empire across India the traditional physical exercise culture was inclusive of Yoga, Prāṇāyāma, wrestling Sūrya Namaskāra, local games, war techniques like fencing, boxing, javelin, horse riding, lāṭhi, Mallakhāmb.

With the change in military training and war techniques traditional physical exercises and war techniques became least important. During British period though the physical education existed in Indian society, but never considered as part of school curriculum.

During this period Swedish gymnastic system was adopted in schools of Britain. The same system was deployed in India, slowly the impact of foreign types of physical education increased and traditional Balopāsanā started to diminish in India.

In the post-Independence culture era more emphasis was given on strengthening the education system and it was made compulsory up to the age of 14. Though physical education was comprised into education system the drive for physical education was not sufficiently vigorous. Though the number of training institutions for physical education had come up after

independence number of schemes to promote sports were started, but it did not work. During this period nation was undergoing transitional developmental changes where education was considered as an important tool of development along with industrialization. Various. Schemes and efforts were continued to promote sports participation, various courses were launched, awards were launched, scholarships were given for talented players.

Present Relevance of Sports field

Since last two decades, effects of development industrialization, commercialization has a great impact on the development of the sports and fitness. It is now popularly conceived as both of socially and personally helpful activity. In modern time the spirit of competition has changed the entire science in sports. It explained in introduction industrialization in 20th century caused rapid development in all sectors in impact was also seen in sports on field.

Sports and fitness participation in increasing. India is developing as giant competitive entity on sports field. The field of sports is being taken up as career activity. The performance requirements are increasing which is increasing the demand and need allied fields of sports sciences too.

This competition is putting excessive performance demands and pressure on sports persons. For Balancing performance and health of sports persons there is a need of holistic approach towards sports sciences. As observed in Review Sanskrit literature, Indian philosophy of Vedas along with practices of Āyurveda and Yoga has explained the concept of Balopāsanā which will be able to fulfill the need of present sports field.

SURVEY OF RESEARCH

Survey of research material was conducted to explain the need and its relevance of this study with present sports field.

This survey of research was conducted using available research journals, published. Unpublished master's doctoral thesis the subject of Sanskrit, physical education, yoga, Āyurveda.

Bhat Arvind N. (2012) has conducted doctoral study on compilation of all Upāsanā in major upniśad. This study was aimed to prove the worthiness of Upāsanā in contemporary world. In this study conventional meaning of Upāsanā and its present perspective of is explained. Upāsanā is defined as the process where in a slow and gradual gliding from the thick gross outer world to

the thinnest innermost subtle world is experienced by upāsaka. in Chāṇḍogya upniśad. In Bhagavad-Gītā's commentary by Adi śankarāchāya, Upāsanā is defined as the technique in which a free flow of single thought is directed towards the deity that is authenticated by shastras and dearest to practitioner. In Taittirīya Upniśad it is defined as the single act of thought of frequent repetition of one and same thought.

In this study Upāsanā is interpreted as the bridge between knowledge and action. It is fully dependent on will, like dislikes and mental setup of a person. It is a rationale behind action conducted by directing mind towards self. Human beings are engaged in three-fold actions as follows:

- 1) Acquisition of knowledge:
- 2) Performing karma (Upāsanā)
- 3) Being communion – God.

In this study various routine activities in grhastha āśrama are explained as Upāsanā:

कृषिगोरक्षादिकया वैशादिवृत्त्या जीवन्नित्यादि क्रियापरौ वार्ताकवृत्ति ।

उपासनानां क्रियात्मकत्वात् । Sankaracharya on B.S. 3.3.42

Thus, Upāsanā are considered thoughtful sincere actions. As Upāsanā are of two types External and internal as per Śivagītā. Pujā, Japa, etc. comprises external Upāsanā whereas meditation is considered as internal Upāsanā. Routine activities can also be considered as external Upāsanā.

According to this study there are three ways of looking at concept of Upāsanā in present world. It can be explained as follows:

- 1) Contemplation procedure (गुणोपसंहार)

The action of looking thoughtfully at something for a long time.

- 1) Resorting (समुच्चय): Resorting to one or more nicely twining the two for a desired result. Turning to or adopting (a course of action) to resolve difficult situation.
- 2) Vikalpa (housing) - the act of chasing any one desirable between many.

Thus, in the present contemporary world the Upāsanā is interpreted as frequent reaction of thought/action with complete devotion. May it be daily routine. While explaining the scientific perspective behind conducting Upāsanā it has been mentioned in this study that, intellectual ability of a person and comprises of intelligence quotient, emotional quotient, and moral quotient. Upāsanā deals with the culture of all this along with the development

of spiritual quotient of a person. Thus, in contemporary world the concept of Upāsana is relevant and worthful for of a person.

This study is supportive to the central concept of Balopāsana of present study and supports the hypothesis of the present study that the Vaidika concept of Balopāsana is relevant with present contemporary world.

Bulti Roy and Samiran Mondal (2016) conducted a literary survey study to understand the concept of Vyāyāma (Exercise) in ancient India. In this study it is observed that, exercise was an important practice of ancient India since Vaidika period as per evidence from Harappa Civilization. Further in this theoretical study gives some fundamental principles of Vyāyāma from Āyurveda literature of Caraka saṁhitā and Suśruta Saṁhitā has been compiled. In these classical texts of Āyurveda, Vyāyāma (Exercise) is considered as an essential component for preventive, curative and rehabilitation medicine, giving rejuvenation and longevity rehabilitation medicine, giving rejuvenation and longevity.

This study supports the present study theoretically. In the present study Vyāyāma is considered as one of the component of Balopāsana and elaborates the link between Balopāsana, Vyāyāma and Āyurveda. Samiran Mondal (2013) conducted another literary survey study to understand the contribution of ancient Indian contribution in the domain of exercise science. In this study they have found that Caraka Saṁhitā, which is the oldest classical text of Āyurveda, consists of more than 120 aphorisms on Vyāyāma (Exercise). It consists of definition of Vyāyāma, good and bad effects of Vyāyāma, contra-indications of Vyāyāma. Effects of Avyāyāma (non-exercise) leading to 20 diseases and Vyāyāma (Exercise) as treatment of diseases like obesity, diabetes. This theoretical study concluded that the knowledge of Vyāyāma in Caraka Saṁhitā should be considered as the oldest tradition of exercise science.

Again, this study supports the present study. As stated in the recommendations of Mondal study, the present study is an attempt to establish the Indian traditional concept of Balopāsana as a holistic science of sports medicine (Kṛīḍāvaidyaka). In addition to Caraka saṁhitā present study includes the review of Bṛhat trayī, Laghu trayī of Āyurveda for the thorough study of concept of Balopāsana.

There are two studies conducted by Tipton C in (2008) and (2014) respectively, where they have studied the history of exercise as Medicine in ancient civilizations across the world. In 2007, the American college of sports Medicine with launched a global initiative to mobilize physicians,

healthcare professionals to promote exercise in their practice to prevent, reduce, manage lifestyle diseases that impact the quality of life in human. This initiative was termed as 'Exercise is Medicine' (EIM). Purpose of this study was to demonstrate the foundation of this global initiative and exercise prescription for health and disease prevention has roots that began in antiquity more than two millennia ago in ancient civilizations across the world. This study was intended to recognize the contribution of physicians and philosophers who have contributed to EIM concept and to complete historical record on the contributions from ancient civilizations to the emergence and acceptance of EIM.

This study demonstrated that river civilization involving the Indus valley and yellow river civilization made contributions to EIM. The excavations from Indus valley demonstrated the existence of myriad of human diseases and structures that revealed a major concern for sanitation and public health. The relevance and importance EIM in R̥gveda use. 1) Diseases and health were result of actions of Gods. 2) Ancient Hindus were aware of the existence and importance of humors, and in addition it provided explanations for the meaning of life and death and relationship between health and diseases too.

In this study individuals who made contribution to concept of EIM were studied. Suśruta of India was the first recorded surgeon to prescribe daily exercise and Hippocrates of Greece was the first recorded physician to provide a written exercise prescription for a patient and the global influence of Galen from Rome combined with his recommendations on the use of exercise for the patients in the management of disease prevailed until 16th century.

In this study and in another study (2008) where Tipton C. has demonstrated that Suśruta was the first physician to prescribe exercise and indicated that it should be done to the half extent of capacity everyday otherwise it may prove fatal. He has also mentioned documentations of Caraka who also advocated foundations of Āyurveda medicine. Caraka and Suśruta have advocated daily exercise but in Suśruta saṁhitā the half extent of capacity is precisely mentioned. This might be the reason of considering Suśruta as the earliest contributor to the exercise physiology in the world. It is also demonstrated that, physician should consider the exercise terrain in assessment of a patient along with age, strength physique and diet. Benefits of exercise are enlisted as it makes the body strong, stout, it prevents laziness and enhances growth of limbs and muscles and improves digestion and complexion. It may prove fatal if done in

excess quantity also relation of exercise and seasonal variations is uniqueness of Āyurveda. Regular exercise as treatment of Madhumeha, prameha and kaphaja diseases.

Thus, these studies support the present study principally and the purpose of this study helps to support the relevance of concept of Balopāsanā of present study in with current era of fitness. Although according to researcher chronologically Caraka Saṁhitā has earlier documentation of exercise than Suśruta saṁhitā which includes prescription of exercise in daily routine (Dinacaryā) but the concept of Ardhaśakti Vyāyāma' (Exercise to the half of the one's capacity) is advocated precisely in Suśruta saṁhitā for the first time. That might be the reason of considering Suśruta as earliest prescribe of EIM or exercise physiology.

Mathys (2010) in his book Medicine and sport discussed the history of sports medicine and he presented the evidences of origin of sport medicine in eastern Asian literature of Atharvaveda.

Review of studies Related to Āyurveda and sports:

Ashok d. Satpute (1989) attempted to explain the ways and means of utilizing the potential of Āyurveda in the field of sports and its original contribution to sports medicine at conceptual level. Sports medicine has two goals to achieve primarily fitness of the sports person and second goal is treatment of sports injuries. He explained the benefits of various Āyurveda treatments for sportsperson. And further recommended thorough in-depth studies to understand the effectiveness of Āyurveda for sportspersons. He anticipated that in the competitive at international sports Āyurveda can help sportsperson to enhance the performance. The integrated approach of modern technological development and incorporation of Āyurveda measures both in fitness and injury management would be highly beneficial.

In the same way Dr. Rahul Jain et all (2015) in their study they have presented the case study of sports injury including diagnosis and treatment with Āyurveda measures of diet, medicine, Pañcakarma. In this study they have mentioned that though the direct references of (Kṛīḍāvaidyaka) sports medicine are not found in Āyurveda texts, but it can be explored and used like Gaja Āyurveda, vrukṣa Āyurveda.

In another study by Dr. Kalpana Jaiswal et. all (2016) entitled Role of Āyurveda in sports medicine, they have given conceptual framework of assessment and lifestyle management of sports person based on Āyurveda texts. This is a conceptual study presenting the theoretical framework.

On the same line Abhilash Mullasseril (2016) presented a study entitled ‘sports medicine an emerging field for Āyurveda’. In this study he has demonstrated the development of modern sports medicine and on the same line scope of Āyurveda in modern sports medicine. He has given the conceptual framework of physical exercise and Āyurveda. Significance of Āyurveda massage in sports, some proprietary medicine has been discussed for its usefulness in sports. In concluding remarks of this study, it is stated that, Āyurveda can be incorporated in sports medicine and recommended further study in this field.

Singh Shyam Babu et all (2014) presented a critical review study on need and importance of vyāyāma in present era. In this review they have described that vyāyāma (physical activity) is necessary for an individual in today’s life to prevent type 2 diabetes, and cardiovascular diseases and digestive disorders.

On the same line Bagade A.B (2015) presented preventive aspect of vyāyāma based on Āyurveda literature. This review article attempts to explain vyāyāma in details as explained in Āyurveda texts. He mentioned that proper physical exercise affects not only body but has positive influence of on mind emotions and senses too.

These review studies support the concept of present study and direct that practical application the need and relevance of concept of Balopāsanā in present era of Krīḍāvaidyaka (sports medicine). Review of application-oriented studies can be presented as follows.

Ganesha Shankar (1994) has done the study to verify some selected body dimensions of physically fit person mentioned in Suśruta saṁhitā. In this study he compared the cardiovascular capacities and Āyurveda dimensions of 360 individuals. Results obtained from present study may be useful in the sense that the persons having the body proportions as given in Āyurveda literature will have a better physical fitness, can perform work for longer time easily and will have a long life. Positive co-relation was observed between cardiovascular endurance and Āyurveda dimensions. This study is useful and supportive in designing assessment of sahaja Bala module for present study.

Nicholas, Andrew et all (2006) conducted a survey study to understand the use of complementary and alternative usage by collegiate athletes. This study demonstrated that use of complementary and alternative medicine is common among student. It included massage (38%), Acupuncture (12%) chiropractic (29%) This study supports the prevalence of massage as preferred complimentary method in Hawaii.

Jason Brummitt (2008) has done the literary survey to study the role of massage in sports performance and rehabilitation. This study concluded that there is a need of additional studies examining the physiological and psychological effects of sports massage are necessary to develop evidence based programs or treatments.

Pai Dheeraj (2010) has conducted a master's research to study 'Balya Rasāyana its applicability in sports medicine'. In this study he has compiled indirect references of regarding various fields of sports medicine from Ayurveda literature and attempted to explain the applicability of principles of Āyurveda in sports medicine and conducted a pilot study to observe the effect of śatāvārī curṇa in sports persons Balya Rasāyana. Results of this study revealed that, there was remarkable improvement in the performance of the athletes in 100 meters, 800 meters long running and long jump. This study further recommended Āyurveda based studies in sports medicine.

There are few studies demonstrating effects of Āyurveda medicines of performance of athletes. They can be presented as follows.

Jaspal Singh Sandhu et. all (2010) studied the effects of Aśvagandhā and Arjuna on physical performance and cardiorespiratory endurance of young healthy adults. Results showed that Aśvagandhā increased speed, VO₂ max and Arjuna increased VO₂ max hence can be used in sports.

In Another study conducted by Shweta Shenoy (2012) where effects of Aśvagandhā supplementation on cardio respiratory endurance in elite cyclists' results showed significant improvement and concluded that Aśvagandhā improved cardiorespiratory endurance of the elite athletes. In a similar study conducted by Sachin Wankhede et all (2015) it has been demonstrated that Aśvagandhā supplementaion is associated with significant increase in muscle mass and strength in combination with resistance training.

The pilot study conducted by Pritesh Dave (2007) where 'Balya Dashemānī' drugs were used to assess its effects of muscle strength. In results Aśvagandhā granules group showed. Significant results in sports person group.

Chhagan Jangid et all (2009) presented the concept of Ṛtu and their effects of Bala. In this study randomized survey was done to study the co-relation between Ṛtu and Bala Results showed positive correlation as stated in Āyurveda texts.

Another study conducted by Sharma Mahesh Kumar (2013) where relationship between immunity (Vyādhikṣmatva) and Bala is studied. This study came up with positive cause and effect relationship between Vyādhikṣmatva (immunity) and Bala.

These two studies directly referred the concept of Bala, though not in context of sports but it supportive to the application of Kālaja Bala assessment for sports persons where effect of seasonal variation is taken into consideration while designing a module of Krīḍāvaidyaka.

All these studies are supportive to the concept of Balopāsanā and its practical applicability in present Krīḍāvaidyaka field. Researcher has observed that all these studies are short term and focusing on single parameters fitness which are recognized in sports field. Researcher feels that there is requirement of holistic approach which can be achieved through interpretation of Āyurveda concepts. This interpretation is attempted in present study.

Studies on Yoga and Sports:

Researcher has conducted bibliographic review study on “The effects of Yogic practices on physical fitness with special reference to cardio vascular Endurance”. For this study over 200 research articles were reviewed to track the past trends of research in this field in past two decades. Conclusion of this study demonstrated with the need of scientific techniques that will enhance physical fitness of athletes ensuring health and longevity. Researcher could rarely observe evidence of application of yogic practices and Āyurveda therapies together for physical fitness. Hence in present study researcher is curious to explore this combination as Balopāsanā module for sports persons.

Another very crucial review of book “Yoga for Sports” by Yogācārya BKS Iyengar. In this book philosophical background of application of yoga for sports is directed by Guruji BKS Iyengar along with practical case studies. In this book concept of holistic fitness inclusive of physical mental, emotional and intellectual aspects have been emphasized. This book is considered as a practical guide to design the presently relevant module of Balopāsanā for sports field based on Indian philosophy.

Findings from the Reviews of Literature:

The review of this study was oriented towards exploring the concept of Balopāsanā from Sanskrit literature and understand its present relevance with the Krīḍāvaidyaka (sports medicine). This review of Literature leads to following findings.

- 1) Concept of Bala (strength) was considered as prime important since Vaidika period.

- 2) Two important contexts of Balopāsanā were observed in Vaidika period. Physical strength is pursued for two important purposes one is for spiritual journey towards liberation and another for wars.
- 3) Direct earlier references of Balopāsanā are found in Vedas and Upaniṣads.
- 4) Epics Rāmāyaṇa & Mahābhārata include direct evidences of the concept of Balopāsanā. Mahābhārata gives direct reference of application of Āyurveda and Yoga for Balopāsanā.
- 5) Āyurveda literature provides elaboration of the concept of Bala and Vyāyāma.
- 6) Purāṇas gives evidences of use of the word Kriḍā for sports. Also shows descriptions of various games, exercises and application of Āyurveda for the same. It supports the existence of the concept of Krīḍāvaidyaka.
- 7) Yogic literature review emphasizes on importance of physical strength and steadiness for the journey of self towards liberation and advocates practical study of Āsana, Prāṇāyāma for the same.
- 8) Survey of research literature supports the present the study and helps to prove the needs practical applicability of the study with Krīḍāvaidyaka.

Chapter 3

Methodology of Exploration of concept of Balopāsanā to present Relevance of Kṛīdāvaidyaka

3.1 Background:

So far, in this study the scope of concept Balopāsanā in Sanskrit literature is explained. In earlier part of thesis present relevance of Balopāsanā is explained with fitness field in the context of health and sport. For this study the sports related fitness is focused.

In the review of literature, we have observed diversity in interpretation of concept of Bala in Sanskrit Literature from Vaidika period. It is considered as physical strength required for wars, an asset towards spiritual journey towards liberty (Mokṣa), strength required for self-protection and religion protection. We have observed correlation of concept of Bala with health, vyāyāma, diseases, immunity and sports. It has been noted that there is a close connecting link between Bala and Āyurveda. There have been references evident that, Āyurveda being practiced and strongly advocated for conservation, enhancement of Bala. Survey of literature of Āyurveda reveals that Bala is one of the most important physiological parameter of health and it is vividly explored with its types, assessment, relation with body composition, age, season, diet, exercise rest, sleep, diseases, etc. It is closely associated with Vyāyāma. Assessment of Bala includes capacity of exercise (Vyāyāma).

बलं व्यायामशक्त्यां परीक्षयेत् । च.वि.४

Bala can be modified or enhanced with proper management of exercise, rest and diet. Vyāyāma are bodily movement which are purposely conducted and are responsible for bringing stability in body and increasing strength.

शरीरचेष्टा या चेष्टा स्थैर्यार्था बलवर्धिनी ।

देहव्यायामसंख्याता मात्रया तां समाचरेत् ॥ च.सू.७।३३

Thus, we can observe the close association of concept of Bala, Vyāyāma and Āyurveda.

If we observe the practical prevalence of concept of Bala and Vyāyāma in present world we come across the field of fitness and sports. In this study researcher is curious to explore the present relevance of concept of Balopāsanā from Sanskrit Literature. For this we need to understand the Āyurveda's point of view towards fitness and Sports. Whether these concepts are mentioned in Āyurveda?

Āyurveda and Sports:

If We closely observe the Āyurveda Literature there are no direct references of sports Āyurveda in texts This might be because of several reasons, as follows:

A) When the Āyurveda scriptures were written the Balopāsanā culture was not predominantly oriented towards sports and games (Krīdā) but it was more inclined towards spiritual journey as we have observed in ROL of Vaidika literature and chronological development of concept of Balopāsanā.

Parādhikāra:

2) scientifically the field of sports and exercise of was not the main subject of exploration for Āyurveda. During the period when texts of Āyurveda were scripted wars and spiritual sādhanā were the predominant contexts of Balopāsanā. Dhanurveda was dedicated upaveda for was techniques and Vedas, and vedāṅgas were dedicated for spiritual context.

Health and longevity related aspects of Balopāsanā are discussed in Āyurveda in detail.

3) Another important reason is to avoid extension of texts. Āyurveda scriptures are written in the 'sūtra' and saṁhitā form. This form follows some reservation on elaboration of certain subjects. Ideal guidelines for this format are given as:

अल्पाक्षरं असंन्दिग्धं सारवत् विश्वतोमुखम् ।

अस्तोभमनवदयं च सूत्रंविदो विदुः ।

वा.सू

Hence to avoid extension of text only necessary important topics are detailed, the texts discuss representative samples and expert reader is directed to derive more on the given guidelines.

दिशाऽनया शेषमपि स्वयंमूह्येत बुद्धिमान् ।

अ.सं.सू. ७ / २३२

But it does not mean Āyurveda does not have anything to comment about sports, since at the end of Caraka saṁhitā it has been pledged that whatever one can find here can get anywhere too but whatever is not mentioned here one will not get anywhere in this world.

यदिहास्ति तदन्यत्र यन्नेहास्ति न तत् क्वचित् ।

च.सि. १२

Āyurveda either have indirect references of certain topics of there are guidelines to explore unmentioned topics (Anukta) or briefly mentioned (Leśokta) topics.

Sports medicine is the topic which applies both formats. Contemporary part of concept of Bala exercise in relation with health are vividly explained in Āyurveda texts. Some of the parts of this concept are directly referred in Āyurveda and some of them are indirectly referred.

Āyurveda also directs the unique method of exploration of unmentioned (Anukta) or briefly mentioned (Leśokta) concepts, which is called as Taṇṭrayukti. With the help of Taṇṭrayukti and mimāṃsā the present relevance of concept of Balopāsanā with special reference to Āyurveda in the field of Krīḍāvaidyaka (Sports medicine) will be explored in the further discussion of this study.

As observed in ROL, presently field of Krīḍāvaidyaka (Sports medicine) needs holistic approach to ensure all round fitness comprising of Balance of Physical, mental, intellectual and emotional abilities for successful sports career. In the further part of this study Balopāsanā module based on Vaidika philosophy and inclusive of Āyurveda and Yoga will be explained. Methodology of this exploration is divided into two parts.

- 1) Exploration of literature on Balopāsanā in Āyurveda and Yoga to design presently relevant module of Balopāsanā which will consist of
 - a) Assessment of Bala.
 - b) Assessment of Vyāyāmaja Balakṣaya of sports persons.
 - c) Balopāsanā module for sports present based on Āyurveda and Yoga.
- 2) To study the practical applicability of this module to understand its relevance with present Krīḍāvaidyaka.

3.2 Exploration of Concept of Bala from Āyurveda:

According to Āyurveda Bala is considered as one of the prime physiological attributes of health. In Suśruta saṃhitā it is defined as follows:

तत्र रसादीनां शुक्रान्तानां धातुनां यत परं तेजस्तत् खल्वोजस्तदेव बलमित्युच्यते, स्वशास्त्रसिद्धान्तात् ।

- Bala is the physiological capacity which is an outcome of best of production oja which is the essence of all body constituents from Rasa to Shukra. Bala is dependant on quality and quantity of oja. It is the ability of body to conduct all bodily functions efficiently क्रियानिर्वर्तनक्षमता ॥

In Caraka samhita normal constitution of kapha Doṣa is the seat of bala body.

प्राकृतस्तु बलं श्लेष्मा विकृतो मलं उच्यते ।
स चैवोजःस्मृतः काये स च पाप्मोपदिश्यते ॥

च.सू. १७/११७

According to principles of Āyurveda, Bala is the complex phenomenon, which is the ability of person to carry out all movements and activities efficiently. It is dependent on normal constitution of Kapha doṣa and Oja which is outcome of purest state of all body constituents qualitatively and quantitatively.

In the comment of Suśruta samhita the difference between Bala and Oja are explained. Bala is the physiological parameter which is responsible for strength and ability to carry out bodily movements like lifting weight etc. whereas Oja is responsible physical indicators of health like complexion etc.

परमार्थस्तु बलौजसोर्भेद एवः यथा भेदस्तदुच्यते सर्वधातुस्नेहभूतस्योपचयलक्षणस्यौजसो रूपरसौवीर्यादि च विद्यते । बलस्य तु भारहरणादिशक्तिगम्यस्य रसवीर्यवर्णादि गुणा न विदयन्ते ।
सु.सू. १७/१९/टी

In this way the concept of Bala is explained precisely as the strength and ability to undertake strength oriented actions like lifting weights efficiently.

Characters of Bala

Physiological and physical characters are of Bala are described in Suśruta samhita as follows:

तत्र बलेन स्थिरोपचितमांसता सर्वचेष्टास्वप्रतिघातः स्वरवर्णप्रसादौ बाह्यानामाभ्यन्तराणां च करणानामात्मकार्यप्रतिपत्तिर्भवति ।

सु.सू. १७/२०

This is the comprehensive description of concept of Bala. It is complete entity inclusive of some external features like body composition, and internal features of mind, senses etc.

In commentry it is explained as

स्थिरोपचितमांसता : Stable well-nourished body constituents especially Mansa dhātu (Muscles)

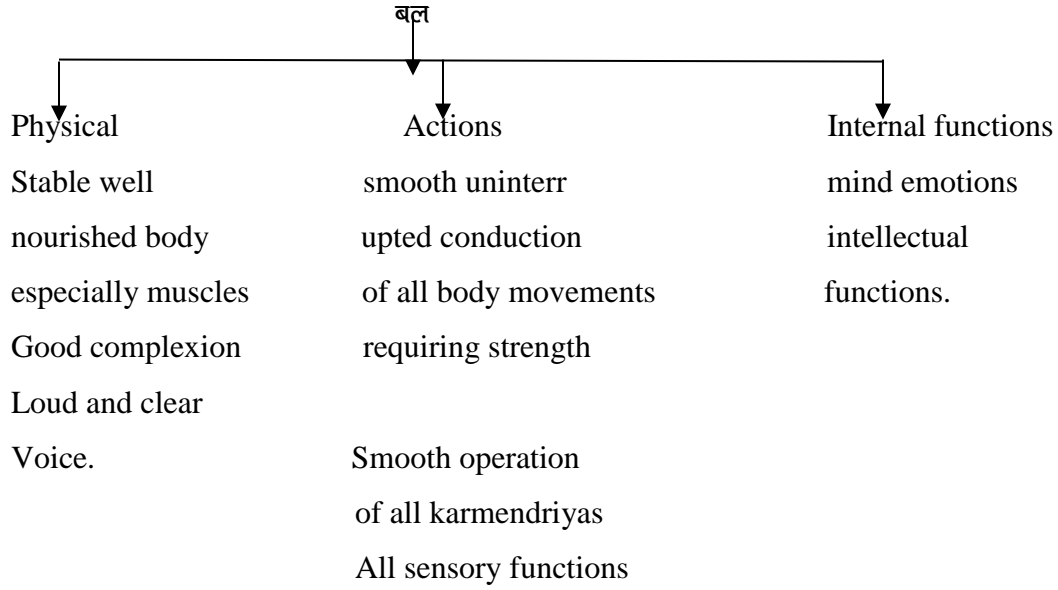
सर्वचेष्टा All bodily movements, mental and sensory functions.

अप्रतिघातो Efficient conduction of all bodily activities requiring strength like weight lifetime etc.

स्वरवर्णप्रसादः :- Good complexion loud voice are the indicators of well nourished body constituents

बाह्यानमित्यादि :- All external body functions (karmendryas) sensory functions and mental and intellectual functions.

Thus, the complex physiological entity of Bala is indicative of all physical, physiological, mental and intellectual abilities altogether. It can be categorized as follows:



In this way Āyurveda gives the comprehensive explanation of Bala. According to Āyurveda, Bala is not only about physical strength but to hold one's ground in circumstances that is readiness to act and mental and intellectual abilities are involved facets of phenomenon of Bala.

In addition this Caraka saṁhitā gives the characters of Bala as:

सममांसप्रमाणस्तु समसंहननो नर ।

दृढेन्द्रियो विकाराणां न बलेनाभिभूयते ।

क्षुत्पिपासासहशीतव्यायामसंसहः ।

समपक्ता समजरः सममांसचयो मतः ॥

Well distributed muscle mass, and well proportionate of all body constituents, strong immune functions and tolerance to heat, cold and bodily urges, like thirst, hunger, along with digestive functions smooth and well balanced muscular metabolism are the features of Bala.

In this verse from Caraka direct co-relation between Bala and Vyāyāma (exercise) is established. According to Āyurveda Vyāyāma is defined as

शरीरचेष्टा या चेष्टा स्थैर्यार्था बलवर्धिनी ।

देहव्यायाम संख्याता मात्रया तां समाचरेत् ।

च.सू.७/३७

शरीरायासजननं कर्म व्यायामसंज्ञितम् ।

च.सू.७/३८

बलं व्यायामशक्त्या परीक्षयेत् ।

च.सू.७/३९

These verses establish concept of Vyāyāma in Āyurveda. Vyāyāma are bodily movements which are brought about with special efforts to create stability in body and enhances strength of body.

It can be summarized that Bala is the capacity to perform any voluntary movement at any time with desired speed and with full power is the essence of Oja, normal Kapha doṣa, pure state of all body constituents especially well-balanced musculature as a result of efficient digestive function and It is also characterized with tolerance capacity for Vyāyāma, heat cold and immune functions.

3.3.1: Concept of Bala and Its Relevance with Sports.

When we observe the present relevance of concept of Bala, we come across the concept of fitness and sports.

Fitness: It is defined as the ability of a person to perform a particular task without undue fatigue. Components of health-related fitness are proportionate body composition, cardiorespiratory endurance, flexibility strength and muscular endurance, in addition to these sports related fitness is composed of agility, speed, power, balance, co-ordination and reaction time. As we can observe all these characteristics are covered under the concept of Bala from Āyurveda. In

addition to this immunity, intellectual abilities, tolerance and stability are the qualities mentioned in concept of Bala.

These characteristics gives the all-round balance of physical, mental, intellectual abilities altogether including the tolerance to withstand the stress on all planes. It is always required for sports persons to excel, succeed and sustain throughout life.

Hence now we will explore the details of concept of Bala from Āyurveda scriptures and understand its relevance with sports.

3.3.: Types of Bala.

Āyurveda has given the threefold classification system for concept of Bala. It is explained as follows: Sahaja Bala, Kālaja Bala and Yuktikṛta Bala

त्रिविधं बलमिति सहजं कालजं युक्तिकृतं च। सहजं यच्छरीरसत्वयोः प्राकृतं, कालकृतमतुविभागजं वयकृतं च, युक्तिकृतं पुनस्तदाहारचेष्टायोगजम् ॥

च सू ११/३६ अ सं शा ८/३०

Based on this the matrix of classification of Bala and its responsible factors can be presented as follows:

Figure 1: Types of Bala

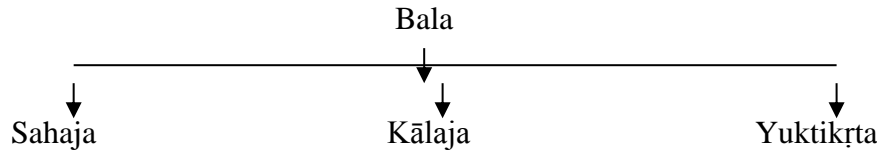


Table 3 Factors Responsible for classification of Bala

1) Responsible Factors		
Prakṛti	Age	Āhāra:
Sāratā	Season	Ceṣṭā (Active movements)
Bala of Parents	Time of day	Vyāyāma,
	State of Digestion	Rest, Sleep
		Medicines

		Rasāyana
2) Time: It is decided at the time of conception and birth.	Time: Depends on age	Time: Depends on above Factors.
3) Nature: Permanent, cannot be changed but develops with natural course of growth.	3) Nature: Unstable Dynamic with age season of year and day and time of digestion	3)Nature: Modifiable with the proper management of diet, exercise, rest sleep and Rasāyana treatment of Āyurveda.

3.3.1 Sahaja Bala:

Sahaja
Bala is
an
innate
physica

l capacity with which individual is born. This depends on factors like Prakṛti or individual constitution. Prakṛti is the specific set of physical, physiological, psychological, sensorimotor and spiritual characters of an individual that are decided at the time of conception. It is dominated by the doṣa and Bala of parents at the time of conception. There are seven possible combinations of doṣa like single doṣa dominant three, two doṣa predominant three and one with all three doṣa (Vāta, Pitta and Kapha) balance each other the samadoṣa Prakṛti . Kapha predominant Prakṛti of single doṣa and samadoṣa Prakṛti are the best and most desirable as it has all the best qualities, but it is extremely rare to find.

There is the special state of metabolism where the purest state of seven dhātus (body constituents) are present. It is known as Sāratā. Sāratā of Seven body constituents and mind are described in Āyurveda. It is specifically oriented to assess quantity of Bala of an individual. If the Sāratā of tissues (body constituents) like Mānsa, Meda, Asthi, Majja, and śukra is greater, then the person possesses good physical power. Satva Sāratā is uniquely described in Āyurveda which is the set of psychological and intellectual abilities. It is responsible for Utsāha i.e. Mental Bala which can be referred as enthusiasm. It is innate in nature. It is the ability to overcome physical characters too. Asāra or hīn sāra are the states of tissues devoid of purity and are rich in the waste products. It predisposes a person with low physical power and resistance. These people are weak in nature from birth and unable to tolerate stress.

Thus, Sahaja Bala is innate strength and ability to withstand stress and which decides the ability to exercise, immunity, body composition etc.

3.3.1 a) Sahaja Bala and Sports:

Sahaja Bala is decisive parameter of future physical strength and ability to withstand stress and tolerance capacity. It is dependant of Prakṛti, Sāratā and parental factors. Sahaja Bala is static in nature it can not be changed throughout life it just progresses with natural process of growth.

Another two types of Bala i.e. Kālaja Bala and Yuktikṛta Bala are dependent on extent of sahaja Bala. Their adjustability is limited with Sahaja Bala. It is also responsible for enthusiasm, psychological makeup of a person which can even overpower the physical strength at times.

All these abilities comprise to sporting ability. For excellence sports persons not only require physical fitness but most importantly ability to exert, eagerness towards stressful physical activities, enthusiasm, tolerance capacity and ability to withstand stress at physical and mental levels. Sahaja Bala is decisive factor of all these characters. Hence it becomes an important predictive factor of future sporting ability of a person.

In modern sports sciences genetic make-up of an individual is considered responsible for types of muscle fibers which further determines the ability to endure the specific physical activities. Slow twitch muscle fibers are responsible for long duration endurance events and fast twitch muscle fibers are decisive of ability to withstand greater resistance activities for short duration of time. It requires genetic testing in laboratory which is a quite expensive method. With the help of these tests appropriate game can be chosen to ensure future success.

Sahaja Bala assessment is an easy method to assess the innate sporting ability of a person at very early age. It can also give leading suggestions for selection of game. Based on Prakṛti and Sāratā physical and psychological characters of an individual can be tested and accordingly suggestions about suitable game types can be given e.g. a person with Kapha Vāta Prakṛti with best Sāratā of Māṅsa, Asthi dhātu is suitable for long distance endurance events or resistance sports like wrestling. Whereas, pitta Vāta Prakṛti with Māṅsa Asthi sāra individual is suitable for short duration speed events like 100 to 400 running, kho-kho etc. In the same way pitta Kapha Prakṛti individuals can give better performance in flexibility events like Yoga, gymnastics and skill-based events like shooting archery etc. Based on psychological characters while assessing sahaja Bala inclination towards team or individual sports can be decided.

b) Role of Sahaja Bala Assessment for lifestyle management of an athlete:

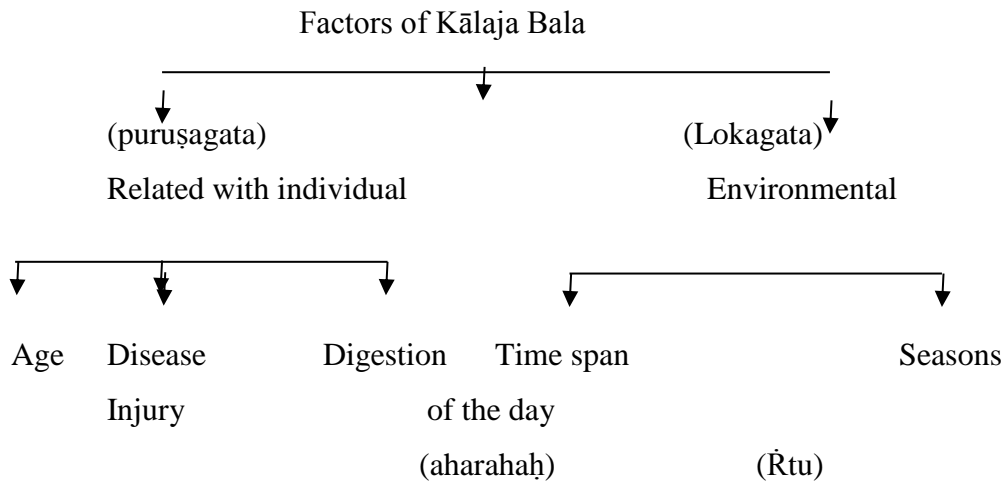
Sahaja Bala assessment can give leading suggestions about overall tolerance ability towards sports and physical exertion. It gives the scope and limitations of a sports person.

Accordingly, appropriate lifestyle management (Yuktikṛta Bala) can be done. Based on this assessment probable injuries can be identified, and preventive measures and appropriate recovery management program can be applied accordingly.

3.3.2. Kālaja Bala:

Kālaja Bala is the effect of time on physical power and efficiency. Time is meant age (Vaya), seasonal variations (Ṛtu), time span of the day (aharahaḥ) and time related with disease (vyādhikāla).

Figure 2: Factors of Kalaja Bala



Caraka Saṁhitā gives explanation of relation of Bala and Kāla with its importance in assessment. It is explained in as follows:

वयस्तश्चेति कालप्रमाणविशेषापेक्षिणी हि शरीरावस्था वयोडभिधीयते । तद्वयो यथास्थूलभेदेन त्रिविधं बाल मध्य जीर्णमिति । तत्र बालमपरिपक्वधातुमजातव्यंजनं सुकुमारमक्लेशसहमसंपूर्णं बलं श्लेष्मधातुप्रायमाषोडशवर्षं, विवर्धमानं धातुगुणंपुनः प्रायेणानवस्थितसत्त्वमात्रिंशद्वर्षमुपदिष्टं; मध्यं पुनःसमत्वागतबलवीर्यपौरुषपराक्रमग्रहणधारणस्मरण वचनविज्ञान सर्वधातुगुणं बलस्थितमवस्थितसत्त्वमविशीर्यमाणमधातुगुणं पित्तधातुप्रायमाषष्टिवर्षमुपदिष्टम अतः परं हीयमानधात्विन्द्रियबलवीर्यपौरुषपराक्रमग्रहणधारणस्मरण वचनविज्ञानं भ्रश्यमानधातुगुणंवायुधातुप्रायक्रमेण जीर्णमुच्यते आवर्षशतम्। वर्षशतं खल्वायुषः प्रमाणमस्मिन् काले, सन्ति च पुनराधिकोनवर्षशतजीवितनोऽपि मनुष्या तेषा विकृतिवर्ज्यः प्रकृत्यादिबलविशेषैरायुषो लक्षणतश्च प्रमाणमुपलभ्य वयसास्त्रित्वं विभजेत॥

च.वि. ८/१२२

Age is the time dependant state of the body. It is grossly divided into three phases child, youth and old age. Childhood is again divided into two phases first phase where all the body constituersts are in developing state till the age of 16 years and second phase where all body constituents are in growing state upto age of 30 years. Middle age or youth is the stage where all the body constituents are fully developed, and physical strength is the best. This stage lasts up to

age of 60 years. Post 60 to 100 years is considered as old age where it starts to diminish physical strength and other abilities.

This classification was done considering 100 years of average age, since during drafting of Ayurveda texts life expectancy was 100 years. But it has been mentioned at the end of aphorism that this trifold division of age should be done according to average life expectancy. Presently life expectancy is around 70 years. Then the childhood (Bāla) stage continues till the age of 21 years, middle age up to age of 42 years and old age up to 70 years.

Co-relation between Bala and age is explained. During earlier bala stage when development of body constituents is ongoing Bala is not completely developed hence it is unstable. Special care should be taken while planning exercise or sports protocol for this age group since naturally the tolerance ability is less, development and Growth is important till the age of 20 Yrs. Hence during this time special attention should be given towards Yuktikṛta Bala management through Proper management of diet, rest and exercise.

- Again Kālaja Bala is dependent of individual of Vyādhi avasthā (disease stage)

काल पुनः संवत्सरश्चातुरावस्था च ।

च.वि. ८/१२५

If someone is affected with any disease, then progress of that disease temporarily affects the bala through the course of recovery. Hence history of previous diseases and injuries is very important while doing assessment of an athlete as it has impact of physical power.

In the same way Bala is variable during daytime, seasonal impact and stage of digestion. This should be taken into consideration while planning exercise or training schedule of athletes. e.g. During summer season, due to influence of ādāna Kāla effect of sun is maximum during daytime between 12 to 4p.m. and pitta doṣa is dominant in the body for digestion. If training is planned during this time it causes excessive sweating leading to rise of vāta, pitta doṣa and reduction of Kapha doṣa Kṣaya. It causes excessive Balakṣaya of a person. Hence these factors are important is assessment of a player.

Now the external time factors are season and time of the day. The seasonal Variation is due to the vertical movement of the sun between the two tropics of Capricorn and Cancer respectively. It is explained in Āyurveda Samhitā as follows-

इह खलु संवत्सरं षडङ्गमृतुविभागेन विद्यात् । तत्रादित्यस्योदयनमादानं च त्रीनृतुच्छिशिरादीन् ग्रीष्मान्तान् व्यवस्येत् । वर्षादीन् पुनर्हेमन्तान्तान् दक्षिणायनं विसर्गं च ।

च.सू. ६/४

विसर्गे पुनर्वायवो नातिरुक्षाः प्रवान्ति, इतरे पुनरादाने, सोमश्चाव्यहत बलः शिशिराभिर्भाभिरापूरयज्जगदाप्यायति शश्वत्, अतो विसर्गः सौम्यः आदानं पुनराग्नेयं, तावेतावर्कवायु सोमश्च कालस्वभाव मार्गपरिगृहिताः कालर्तुरसदोषदेहबलनिर्वृत्ति प्रत्ययभूता समुपदिश्यन्ते ।

च. सू. ६/५

Ādāna Kāla Description-

तत्र रविर्भिराददानो जगतः स्नेहं वायवस्तीव्ररुक्षाश्चोपशोषयन्तः शिशिरवसन्तग्रीष्मेषु यथाक्रमं रौक्ष्यमुत्पादयन्तो रुक्षान् रसांस्तिक्तकषायकटुकाश्चाभिवर्धयन्तो नृणां दौर्बल्यमावहन्ति ।

च.सू. ६/६

Visarga Kāla description

वर्षाशरत् हेमन्तेषु च दक्षिणाभिमुखेऽर्ककालमार्गमेघवातवर्षाभिहतप्रतापे, शशिनि चाव्याहतबले, माहेन्द्र सलिल प्रशान्त सन्तापे जगति, अरुक्षा रसा प्रवर्धन्तेऽन्तलवणमधुरा यथाक्रमं तत्र बलमुपचीयते नृणामिति ॥

च.सू. ६/७

Relation between Seasonal variation and Bala:

आदावन्ते च दौर्बल्यं विसर्गादानयोर्नृणाम् ।

मध्ये मध्यबलं, त्वन्ते श्रेष्ठमग्रे च निर्दिशेत ॥

च.सू. ६/८

The winter, spring and summer constitute the uttarāyaṇa it is known as ādāna Kāla. During this period the effect of sun goes on increasing due to near perpendicular incidences of sunrays on the earth surface and the climate is progressively dry, light and the result of depletion of the fluid and unctuous content of intend environment. The season exhibit a predominance of single taste in each season like bitter in winter, astrigest in spring and pungent in the summer, they all are capable of increasing vāta owing to their light subtle, dry, rough and mobile attributes in the internal environment. Thus, it progressively leads to accumulation of vāta doṣa in the internal environment. It results in diminishing body power and efficiency.

Downward movement of the sun is seen during dakṣiṇāyana it is also known as visarga Kāla. The effect of the sun gradually becomes weaker and the effect of moon or soma goes on increasing due to shorter duration of the day and longer nights and the result is gradual increase in the physical power and efficiency of an individual. There is dominance of single taste in each

season i.e. sour in monsoon, salty in post monsoon heat and sweet in autumn respectively. This results in improved function of Agni which leads to qualitative and functionally adequate Rasa and Ojus dhātu. It increases physical power, efficiency and a sense of well-being.

Hence autumn/hemant, winter/śiśira and spring/ vasanta are the best seasons for well-being and physical power. Winter and monsoon are medium for physical power whereas summer and late monsoon are the worst periods of the year for physical power and efficiency and health.

Ṛtucaryā is advocated in Āyurveda to maintain the equilibrium of body constituents affected by seasonal variations.

Role of Kālaja Bala in Sports:

Periodisation of training is a very important concept in sports. It deals of with planning of training (physical exercise) to develop physical fitness required for competitive success. Periodization is defined as the long term cyclic structuring of training to maximize performance to coincide with important competition. It is planned systemic variations in training intensity and volume. Knowledge of effect of Kālaja Bala is useful in planning the lifestyle of athlete including diet, rest, medicinal management to minimize the impact of seasonal variations on physical power and efficiency. Principals of Ṛtucaryā are useful in for this.

Travelling is another inevitable part of any sport person's life. They have to travel across the world for competitions and training. Players have to adjust with various climatic conditions. It is called as acclimatization. Guidelines of impact of seasonal variations and Ṛtucaryā methods are useful in planning acclimatization of athletes to ensure physical power and efficiency in different climatic conditions.

Knowledge of Kālaja Bala i.e. seasonal variations of physical power in useful in planning of preventive strategies to reduce its impact on Vyāyāmaja Balakṣaya (exercise induced fatigue). It is an inevitable part of training and competition. One can reduce impact of exercise induced wear and tear of body with proper proactive implementation of preventive measures.

प्रत्यहं क्षीयते श्लेष्मा ।

अ.सं. सू ३

Thus, the concept of Kālaja Bala is important for sports persons. According to seasonal variation exercise is indicated and contraindicated in certain seasons like summer and monsoon. But during competitive requirements it is not always possible for athletes to avoid exercise during

this time. But considering the possible effects of season and vyāyāma on body constituents. Appropriate preventive and restorative measures of can be planned beforehand.

3.3.3 Yuktiṛta Bala:

Yukti Means to join diverse facts to yield a logical inference. Its relevance with power means proper management of diet and exercise considering physical type for acquiring power. Before explaining the factors of Yuktiṛta Bala we need to understand the concept of Yukti in Āyurveda

a) Yukti:

In Āyurveda concept of “Parādi guṇa” is described for physicians to gain success in the treatment. Yukti is one of the facets of these Parādi guṇa

परापरत्वे युक्तिश्च संख्या संयोग एव च ।
विभागश्च पृथक्त्वं च परिमाणमथापि च ॥
संस्कारोड्भ्यास इत्येते गुणा ज्ञेया परादयः
सिद्ध्युपायाचिकित्साया ॥

च.सू. २६/२९.३०

देशकालवयोमानपाकवीर्यसादिषु
परापरत्वे, युक्तिश्च योजना या तु युज्यते ॥

च. सू. २६/३१

युक्तिश्चैत्यादौ योजना दोषाद्यपेक्षया भेषजस्य समीचीन कल्पना अत एवोक्त या तु युज्यते, या कल्पना यौगिकी भवति सा तु युक्तिः उच्यते । युक्तिश्चेयं संयोगपरिणामसंस्काराद्यन्तर्गता ऽप्यत्युप युक्तत्वात् पृथगुच्यते ।

चक्रपाणि टीका

Yukti has been quoted as a specialized plan of operation desired for a specific condition. Yukti is the knowledge to use or apply all the types of definite and indefinite. It is the solitary property by which all other guṇa can be applied in different ways. Without Yukti the validation of other guṇa and karma may not be possible. For any kārya (action) to happen many kāraṇa are needed similarly to achieve perfection in a kārya, ones should take care about all contributing kāraṇa (cause) should be optimally devised for paramount results. Mechanisms of providing premier results by altering kāraṇa to their state of excellence is called as Yukti.

Cakrapāṇi has commented on it as follows. Yukti is apt use of medicine based on factors like doṣa, duṣya etc. The dosage of medicine which is perfect for a specific condition is called Yukta. One which does not suit is called as Ayukta. Further opinion of inclusion of Yukti under

samyoga, pariṇāma and saṁskāra etc. gunas is condemned because of its ultimate utility in planning of treatment, it has been mentioned separately.

In the context of Yuktikṛta Bala it has been mentioned that,
युक्तिकृतं पुनस्तद्यदाहारचेष्टायोगजम् ।

च.सू. ११/२६,३६

आहारस्य मांससर्पिरादे चेष्टाया उचितविश्राम व्यायामादेर्योग आहारचेष्टायोग, अन्ये तु योगशब्देन रसायनप्रयोगं ग्राहयन्ति ।

चक्रपाणि टीका

Thus, Yuktikṛta Bala is the physical power acquired by proper management of diet, appropriate combination of exercise and rest and Rasāyana therapy.

Along with Yukti another Parādi guṇa i.e. Abhyāsa is very important in the context of Yuktikṛta Bala. Āyurveda's context of Abhyāsa is explained in Caraka saṁhitā as follows: -

b) Concept of Abhyāsa

भावाभ्यसनमभ्यासः शीलनं सततक्रिया।भावस्य षष्टिकादेर्व्यायामादेश्चाभ्यसनमभ्यासः। अभ्यसनमेव लोकप्रसिद्धाभ्यां पर्यायाभ्यां विवृणोति शीलनं सततक्रियेति, यं लोकाः शीलनसततक्रियाभ्यामभिदधति सोऽभ्यास इति भावः। अयं च संयोगसंस्कार विशेषरूपोऽपि विशेषेण चिकित्सोपयुक्तत्वात् पृथगुच्यते ।

चक्रपाणि टीका

भावनामभ्यसनमभ्यास आवृत्तिः। शीलनं पुनःपुनरनुष्ठानं सततकरणं क्रियासातत्य । येन देहमनोभ्यानेकीभूयाचारविशेषफलं चिरमवतिष्ठते सोऽभ्यासः ।

गंगाधर टीका

Repeated and continuous administration of a particular thing (bhāva) is called as Abhyāsa. Cakrapāṇi has provided examples as of bhāva as śaṣṭik śāli (a type of Rice) i.e. Āhāra, Vyāyāma etc. Abhyāsa has been explained with two terms śilana i.e. administration of particular thing and satata kriyā i.e. continuous repetition of same thing or practice. Abhyāsa can be incorporated under samyoga and saṁskāra but it is mentioned separately because of its uniqueness and importance in treatment of a person. Gangadhara has explained. Abhyāsanam as āvruttī and śilana i.e. repeatedly doing same thing/process. Satata Karaṇam is doing an act continuously over period. Abhyāsa has been defined as an act which provides special benefits to body and mind by continuous practice for longer time.

Thus, Yukti and Abhyāsa both are essential for Yuktikṛta Bala development. Materials alone cannot bring success but when collaborated with proper methods and continuously followed then only desired goals can be acquired. Yukti and abhyāsa can be considered as methods for successful achievement of future. All round fitness desired for sports i.e. Bala can be

achieved with Yukti (proper management) and Abhyāsa (practice) of diet, exercise and restorative methods.

C) Factors involved in Yuktikṛta Bala:

For development of Yuktikṛta Bala appropriate management of few factors as follows:

- 1) Āhāra - Nutrition
- 2) Vyāyāma - Exercise
- 2) Vihāra - Proper rest and lifestyle Management
- 3) Yoga - yoga or Rasāyana therapy

Proper planning of these factors considering the body type is necessary. Physical strength can be acquired by doing appropriate type of exercise along with proper diet, and application of Rasāyana as required. For enhancing power and efficiency exercise, rest and ingestion of foods that are unctuous, heavy, cold, solid, strengthening according to Agni (digestive fire) and digestive ability are equally important. These foods specifically include māṃsa (nonveg) ghee, milk etc.

Āhāra is one of the base of tripod of life (Trayopastambha). Its features are explained as follows-

आहार : प्रीणनं सद्यो बलकृत देहधारकः ।

आयुस्तेज समुत्साह स्मृत्योजोडग्निविवर्धनः ॥

सु.चि.४०/६८

प्राणिनां पुनर्मूलमाहारो बलवर्णोजसां च ।

आहारादेवाभिवृद्धिर्बलमारोग्यं वर्णेन्द्रियप्रसादनम् ।

सु.सू. ४६/१

त्रयोपस्तंभ –

आहारः स्वप्नो ब्रह्मचर्यमिति एभिस्त्रिभिर्युक्तियुक्तैरुपस्तम्भमुपस्तम्भैः

शरीरं बलवर्णोपचयोपाचितमनुवर्तते यावदायुःसंस्कारात् संस्कारमहितमनुसेवमानस्य च इहैवोपदेश्यते ।

च.सू. ११३५

Food is considered as the base of physical body and it gives instant energy, power, enthusiasm, memory (Mental Functions). It instantly creates Oja which is the seat of power and improves functioning of Agni (Digestive fire). Further it is considered the root cause of body and responsible for long life, growth, power, health and smooth functions of sensory motor organs.

In Caraka samhita Āhāra is considered one of base of tripod that maintains life, other two comprises of sleep and abstinence. Proper planning and application of these three elements are responsible for generating physical power, well-nourished body constituents, complexion etc. and at the same time if it is followed in a wrong way it may hamper power, complexion etc.

Guidelines of nutrition are given in detail in Āyurveda. It is called as Āhāravividhiviśeṣāyatana. It will be discussed in detail in Balopāsanā module in upcoming part of this study. Balya Āhāra, medicines are also mentioned in Āyurveda in various contexts, that will also be included in later part of this study.

2) Exercise (Vyāyāma)

Vyāyāma (Exercise) is another important of factor Yuktikṛta Bala development. As have seen earlier Vyāyāma is defined as;

शरीरायासजननं कर्म व्यायामसंज्ञितम् ।

सु. चि. २४/३८

अ. सं.सू. ३/३३

शरीरचेष्टा या चेष्टा स्थैर्यार्था बलवर्धिनी ।

देहव्यायाम संख्याता मात्रया तां समाचरेत्॥

च. सू. ७/३१

व्यायाम स्थैर्यकराणां श्रेष्ठः ।

च.वि. २५

Vyāyāma is defined as bodily movements which are brought about with special efforts to create stability in body and to enhances physical power. vyāyāma is considered as the best practice to create stability and firmness in body and life.

In Āyurveda texts benefits of Vyāyāma are described vividly. If it is followed in moderation it gives gratifying result in increasing power, stability and efficiency.

In order to create desired power vyāyāma should be conducted properly. Its guidelines and benefits are explained in Āyurveda as follows:

शरीरोपचयः कान्तिर्गात्राणां सुविभक्ततां ।

दीपाग्नित्वमनालस्यं स्थिरत्वं लाघवं मृजा ॥

श्रमक्लम पिपासोष्णशीतादीनां सहिष्णुता ।

आरोग्यं चापि परमं व्यायामादुपजायते ।

न चास्ति सदृशं केन किञ्चित् स्थौल्यापकर्षणम् ।

न च व्यायामिनं मर्त्यमर्दयन्तरयो बलात् ॥

न चैन सहसाऽऽक्रम्य जरा समधिरोहति ।
 स्थिरीभवति मङ्गलैः च व्यायामाभिरतस्य च ॥
 व्यायामस्विन्नगात्रस्य पश्चात् उद्वर्तितस्य च ।
 व्याधयो नोपसर्पन्ति सिंहं क्षुद्रमृगा इव ॥
 वयोरुपगुणैर्हीनमपि कुर्यात् सुदर्शनम् ।
 व्यायामं कुर्वतो नित्यं विरुद्धमपि भोजनम् ॥
 विदग्धमविदग्धं वा निर्दोषं परिपच्यते ।
 व्यायामो हि सदा पथ्यो बलिनो स्निग्धभोजनाम् ॥
 स च शीते वसन्ते च तेषां पथ्यतमः स्मृतः ।
 सर्वेष्वृतुष्वहरहः पुम्भिरात्महितैषिभिः ॥
 बलस्यार्धेन कर्तव्यो व्यायामो हन्ततोऽन्यथा ॥
 हृदि स्थानस्थितो वायुर्यदा वक्त्रं प्रपद्यते ।
 व्यायाम कुर्वतो जन्तोस्तब्दलार्धस्य लक्षणम् ॥
 वयोबलशरीराणि देशकालाशनानि च ॥

सु.चि.२४/३९.४८

लाघवं कर्मसामर्थ्यं दीप्तोऽग्निर्मेदसः क्षयः ।
 विभक्तघनगात्रत्वं व्यायामादुपजायते ॥

वा. सू.२/१०

Vyāyāma is advocated and praised by all Āyurveda texts. Vyāyāma done with moderation is considered beneficial. This moderation is the half of limit one's maximum strength. Indications of this limit are described as when one needs to start breathing through mouth, appearance of sweat in palms, feet, and forehead, armpit and tip of nose. Half limit exercise is useful throughout the year but, considered most beneficial in winter and spring.

Exercise done with above moderation gives following benefits:

- Well-nourished body and well-defined body constituents especially musculature.
- It gives stability and lightness to the body.
- It removes laziness and stagnation from the body.
- It is the best measure to reduce excessive fat to get rid obesity.
- It improves the stability of muscles and improves muscular bulk in the body.
- Exercise improves tolerance capacity to thirst hunger, heat and cold etc.
- It improves immunity, and prevents from diseases

- It improves function of digestive fire that contraindications of viruddha Āhāra are not applicable for one who regularly exercises.
- One who exercises regularly becomes able to digest unctuous, heavy food.
- After Vyāyāma rubbing of medicinal powder (Udvardana) and mardana (massage) improves complexion and strength with Regular exercise one can improve body composition complexion, health and long life can he becomes attractive.
- Vyāyāma improves efficiency and enthusiasm.
- One who exercises regularly does not need to do seasonal cleansing processes for reduce vitiation of doṣa.

For all these benefit exercise is strongly advocated in Āyurveda for power and efficiency along with proper rest and food.

3) Vihāra:

Vihāra is another important factor of Yuktikṛta Bala. It includes appropriate combination of exercise and rest. It also includes preventive health measures (Svasthanavṛtta) cited in Āyurveda i.e. Dinacaryā (Daily routine), Ratricaryā (Sleep and abstinence) and Ṛtucaryā (seasonal routine).

a) Nīdrā (Sleep):

Sleep is one of the important part of vihāra and rest. benefits of sleep are described as follows:

निद्रायत्तं सुखं दुःखं पुष्टीः काश्यं बलाबलम् ।

वृषता क्लीबता ज्ञानमज्ञानं जीवितं न च ॥

च.सू. २१/३६

Proper sleep is responsible for good and bad effects. When it is properly followed, it gives benefits of happiness, power, nourishment of body constituents, knowledge and life. If it is not properly taken it is responsible for negative effects like unhappiness, malnourishment, reduced power and effective reduced sexual activity and death too.

Sleep should be taken at night for attaining proper benefits of health. Sleeping during daytime is contraindicated for all in seasons except summer. Those who are exerted, injured, pregnant, children can sleep during daytime to compensate wear and tear of kapha doṣa and body constituents to conserve power (Bala)

गीताध्ययनमद्यस्त्री कर्मभाराध्वकर्षिता : ।

सर्व एते दिवास्वप्न सेवेरन् सर्वकालिकम् ॥

धातुसात्म्यं तथा ह्येषां बलं चाप्युपजायते ।
श्लेष्मा पुष्णाति चाङ्गानि स्थैर्यं भवति चायुषः ॥
ग्रीष्मे तु आदानरुक्षाणां वर्धमाने च मारुते ।
रात्रिणां चातिसंक्षेपादिपास्वप्नः प्रशस्यते ॥

च.सू.२१/३९.४३

In summer due to excessive heat and dryness, shortness of night excessive increase of Vāta doṣa is observed to compensate its effects moderate sleep during day time is desirable. The same is applicable for those who follow exercise during summer.

ii) **Brahmacarya (Abstinence):**

Abstinence comprises Vihāra (lifestyle) referred in Yuktikṛta Bala development. It is one of the base of tripod (trayopstambha) of life. Proper abstinence is responsible for power and excessive sex is reason of decrements in power (Bala). It is described as follows:

आयुष्मन्तो मन्दजरा वपुर्वर्णबलान्विताः ।
स्थिरोपचितमांसाश्च भवन्ति स्त्रीषु संयताः ॥

सु.चि.२४/११२

One who follows proper abstinence is able to achieve power, complexion, good body composition along with well-developed musculature.

Hence abstinence should be observed along with exercise while planning regime for Yuktikṛta bala.

iii) **Dinacaryā (Daily Routine):**

Dinacaryā comprises daily routine practices to be followed for healthy long life. It includes guidelines of daily routine from waking up. Vyāyāma (exercise) is part of it. For healthy life and development of power there are same procedures which need to be practiced after exercise to enhance effects of exercise and to compensate the wear and tear caused by exercise. It includes Abhyaṅga (massage) Udvartanaa (rubbing medicinal herbs to body), Pādābhyaṅga (foot massages nasya (nasal) and snāna (shower). These practices are advocated to be followed along with Vyāyāma.

Details of these practices will be discussed in Balopāsanā module with its relevance in sports in later part of this study.

iv) **Rtucaryā: (Seasonal Routine):**

Rtucaryā means seasonal routine including instructions about do's and don'ts of lifestyle according to seasonal conditions throughout the season. As mentioned in concept of Kālaja Bala

from Āyurveda, year is divided into two spans i.e. Ādāna Kāla and Visarga Kāla. Ṛtucaryā includes guidelines about exercise to be followed, to minimize the effect of season on health.

Details of Ṛtucaryā practices in with the context of sports will be discussed in Balopāsanā module in upcoming part of this study.

V) Rasāyana:

Basic principle of Āyurveda is to maintain health of healthy person for long life and cure diseases. Medicines are the medium of treatment it is of two types according to Āyurveda

भेषजं द्विविधं च तत् ।

स्वस्थस्योर्जस्करं किञ्चित् किञ्चिदार्तस्य रोगनुत् ।

च.चि.१/१/४

First type of medicines is meant for increasing vigor and vitality of healthy person and another type deal with treatment of diseases.

स्वस्थस्योर्जस्कर यत्तु तद्दृष्य तद्रसायनम् ।

च.चि.१/१/५

Health enhancing medicines are of two types one is Rasāyana and other is Vruṣya. Rasāyana therapy involve clinical effects life vayasthāpana (anti-ageing) Medhākara (increasing intellectual abilities), Balakar (increasing physical power) etc. Rasāyana therapy works like rejuvenation and promotes healthy life by preventing diseases. The ultimate aim of Rasāyana is to maintain the equilibrium of doṣa, and dhātu and improve function of digestive fire (Agni) which in result improves Oja, which is the seat of power, strength, immunity, memory longevity, efficiency etc.

Rasāyana therapy is of three types Naimittik Rasāyana, Ajasrik Rasāyana and kāmya Rasāyana, Naimittik Rasāyana is the type of Rasāyana therapy with specific purpose. Ajasrik Rasāyana is used to improve health by maintaining healthy lifestyle, diet and exercise. It involves utilization of milk, ghee and maintenance of disciplined life style. Both Rasāyana therapy are useful in planning of Yuktikṛta Bala. Kāmya Rasāyana is planning of therapy for improving specific functions like improving prāṇa. Memory in the same way for improvement of Bala Kāmya Rasāyana therapy can be planned with use of Balya, bṛhana medicines.

Thus, application of Rasāyana therapy in sports will be explained in detail in Balopāsanā module of in upcoming part of this study.

D) Assessments Required for Yuktikṛta Bala:

Yuktikṛta Bala is the strategic planning of diet exercise, rest, Rasāyana and lifestyle to nurture desired power in individual. This is a multifold approach which should be planned as per need of an individual. Hence, assessment of few important factors of an individual is mandatory before planning Yuktikṛta Bala regime to achieve the desired goal.

Yuktikṛta Bala involves factors of Āhāra, exercise, rest, and lifestyle and Rasāyana. Agni is very important factor while planning of Āhāra. Vyāyāma Śakti and tolerance ability are important in planning exercise. Lifestyle record is necessary to make required suggestions correction and Rasāyana therapy.

Individualisation and specification can be achieved with following assessments before planning Yuktikṛta bala regime.

- 1) Āhāraśaktī: It involves abhyavaharan capacity and digestive capacity (Jaraśakti). It can be tested with hunger and some clinical examinations.

2) Vyāyāmaśakti: कर्मशक्त्या परीक्षया

च.वि. ८/१२१

It can be tested with specific activities like lifting maximum weight in one attempt, lifting weight and doing multiple repetitions, sustaining exercise for duration till half capacity mark. With the help of these tests basic ability of an individual can be assessed. Ability to recover quickly from sustained exercise denotes the tolerance capacity. It can be tested in terms of recovery time required to bring the vitals to normal and with the help of clinical symptoms.

Along with these parameters Balopakāraka a bhava or bala vrudhikara bhava (desired aspects of bala) are also important in Yuktikṛta Bala assessment. These factors are described as follows:

बलवृद्धिकरास्त्वमे भावा भवन्ति । तद्यथा बलवत्पुरुषे देशे जन्म बलवत्पुरुषे काले च , सुखश्च कालयोगः बीजक्षेत्र गुणसंपच्च आहारसंपच्च, शरीरसंपच्च, सात्म्यसंपच्च, सत्वसंपच्च स्वभावसंसिद्धिश्च, यौवनं च, कर्म च संहर्षश्चेति ॥

च.शा. ६/१३

Geographical distribution plays an important role in the development of physique and power of a person. People from northern state like Punjab have a sturdy physique. Balavat puruṣe refers to getting birth in family of healthy and strong people with no hereditary diseases makes a person strong and healthy.

Balavat Kāla refers to seasonal influence on strength. Person born in autumn, winter and spring has better physical strength than one born in summer, monsoon. Bīja Kshetra guṇa Saṁpat is related with parental health which includes health of sperm and female reproductive system. If they are having good quality and not contaminated with diseases, they give rise to strong progress. Hence preconception health of both parents and antenatal health of mother and baby play vital role in healthy generation.

Āhāra Saṁpat: Quality of food also impact on development of body constituents.

Śarīra Saṁpat: Body without any malformation and disease is essential for better physical strength.

Sātmya Saṁpat: Sātmya means homologation. It depends on Prakṛti and it can be developed with Abhyāsa. Person with homologation with maximum factors likes, tastes, food, heat, cold exercise is supposed to have good physical strength, efficiency and immunity.

Satva Saṁpat: It is the mental attitude. Influence of sattva, rājas, tāmas characters on mind is instrumental in deciding the capacity to withstand stress and pain. Person with influence of satva, rājas guṇa is having better tolerance ability than tāmas. Thus, it is important to consider the mental state of a person in evaluation of physical strength.

Svabhāva Saṁsiddhī: It means practice of natural actions that will improve strength e.g. consuming wholesome food, disciplined lifestyle, regular exercise, adequate rest, moderate sexual activity, All these lead to good strength and efficiency.

Yauvanam: Youth is the stage of completed growth and development of body constituents and mental alertness. Hence naturally this stage gives rise to good physical strength and efficiently.

Karma: Activities like exercise when done regularly add to the power and efficiency.

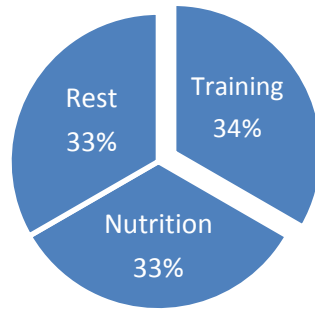
Samharṣa: It is the sense of well-being and positive mind set which is arising out of balanced physical and mental state. This contribute to power and efficiency of an individual hence it should be taken into consideration.

In this way concept of Yuktikṛta bala is explained in Āyurveda texts. While planning assessment of Yuktikṛta Bala above explained factors should be taken into consideration along with Sahaja and Kālaja Bala. Based on all these factors assessment module of Bala is designed by researcher. It is explained in later part of this study.

E) Role of Yuktikṛta Bala in Sports:

Yuktikṛta bala is strategic planning of favourable factors for improving one's power. With the context of present sports medicine field, it can be called as lifestyle management program for an athlete. If we observe the contribution of this lifestyle management program in athlete's success, it is almost equally important with training for specific games. According to present sports sciences contribution of training, nutrition and recovery in performance is described as:

Figure 3: Contributon of training, rest and Nutrition in performance of an athlete



Hence planning of Yaktikrut bala planning is important in performance of an athlete. As per overview of scope of Yuktikṛta bala it gives holistic approach of all round fitness required in sports field involving all physical, mental, Intellectual aspects. One can achieve not only performance but also conservation of health and longevity with planning Yuktikṛta bala.

Yuktikṛta Bala planning is very important in enhancement of fitness (Bala). As we have observed one's sahaja (innate) power cannot be changed and we have least control over impact of Kālaja (seasonal variation) Bala, hence we can fine tune for improving one's fitness with proper strategic planning of factors involved in Yuktikṛta bala. Consideration of impact of geographical and seasonal variation is essential for this.

ROL of Vaidika literature reveals that Balopāsanā is the worship of physical power through exercise medicine and disciplined lifestyle. Now we have observed that scope of concept of Bala in Āyurveda is vividly through this trifold classification of system of Bala. It deals with every possible practical factor involved in nurturing of one's fitness though it is not directly mentioned in terms of sports/Kriḍā but Āyurveda texts give references of "Nitya vyāyāmasevinaḥ" (one who practices exercise regularly) can be considered relevant to sports at present. Based on factors involved in Yuktikṛta Bala and philosophy of Yukti (strategic

planning) and Abhyāsa (practice) Balopāsanā module is designed for athlete's in upcoming part of this study. Based on this trifold classification of Bala an assessment module, of Balopāsanā module inclusive of Āyurveda and Yogic practices is designed. Along with this Vyāyāmaja Balakṣaya (exercise induced wear and tear) is an inevitable part of sportsmen's life. For compensation of this Balakṣaya, timely assessment and treatment is necessary. Assessment module of assessment of Vyāyāmaja Balakṣaya is designed by studying the effects of Vyāyāma (Exercise) on doṣa and dhātus and ojus.

3.4: Assessment of Bala:

Introduction:

Assessments are important in the field of sports. It is evaluation of strength and weaknesses of performer relative to the demands of sports. It helps in deciding the suitable training load and monitoring the effectiveness of training. In addition to this, assessment helps in understanding the baseline of ability, identifying risk factors and prevention of the same.

According to Āyurveda assessment is termed as parīkṣā. It means through investigation. Cognition of valid state of an object is Parīkṣā. It is very essential to have complete knowledge about patient and its disease before planning any treatment. In Caraka saṁhitā purpose of assessment is described as follows.

आतुरस्तु खलु कार्चदेशः। तस्य परीक्षा आयुषः प्रमाणज्ञानहेतोर्वा स्याद् बलदोष प्रमाणज्ञानहेतोर्वा । तत्र तावदियं बलदोषप्रमाण ज्ञानहेतो दोषप्रमाणानुरूपो हि भेषजप्रमाणविकल्पो बलप्रमाणविशेषापेक्षो भवति ।

च.वि. ८/९४

A patient constitutes the site for the administration of therapies with a purpose to maintain the homeostasis of body constituents. The purpose of assessment is to obtain knowledge regarding the span of life, strength of patient and intensity of doṣas. Application of therapy is dependant on strength and doṣa and patient. Hence thorough assessment of strength of the patient is needed to bring specificity and accuracy of therapy.

If a physician administers intensely potent drug without proper examination, it may kill the patient. Because patient is incapable of tolerating strong therapies. Similarly, if weak therapies are administered to a strong individual without proper assessment of strength then it is not useful. Hence the individual should be assessed thoroughly before starting the treatment. There are different types of assessments described in Āyurveda.

- 1) **Dvividha** (two-fold assessment): Pratyaksha (direct examination), Anumāna (indirect inference method)
- 2) **Trividha** (Three-fold assessment): Darśana (by direct observation) sparśana (touch/palpation) and praśna (Questioning / interviewing)
- 3) **Caturvidha** (Four-fold assessment): Pratyaksha (Direct examination) Anumāna (Inference), Āptopadeśa (As described in Samhitā) Yukti (inference collated method)
- 4) **Daśavidha** (Ten-fold assessment) involves 10 factors of assessment.

Daśavidha examination is the most comprehensive method of diagnosis involving 10 factors of assessment. It includes kāraṇa (cause of action) Karaṇa (instrument of treatment) Kāryayoni (original source of action) Kārya (treatment) Kāryaphala (goal of action) Anubandha (after effects) deśa (place of action geographical place of treatment and patient), Kāla (time of therapy), Pravrutti (initiation of an action) Upāya (plan of treatment).

In tenfold assessment method deśa is of two types viz bhumi deśa (geographical place) and āturdeśa (patient). Yuktikṛta bala is strategic planning of factors of enhancing strength of an individual. Hence, it is necessary to assess strength of the patient before planning for Yuktikṛta Bala development.

Following factors are involved in Āturdeśa assessment.

तस्मादातुरं परीक्षेत प्रकृतितश्च विकृतितश्च सारतश्च संहननश्च प्रमाणतश्च सात्म्यतश्च सत्वतश्च आहारशक्तितश्च व्यायामशक्तितश्च वयस्तश्चेति बलप्रमाणविशेषग्रहणहेतोः।

च.वि. ८/९४

knowledge of strength of patient is necessary for prescribing accurate and specific treatment. Assessment of following factors is required for understanding exact measure of strength of an individual.

1. Prakṛti : Basic constitution
2. Vikṛti: presence of any anomaly or disease etc.
3. Sāratā: purity of body constituents
4. Samāhanan: body composition
5. Pramāṇa: anthropometrical measures
6. Sātmya: habituation
7. Satva: mental abilities
8. Āhārashaktī: appetite

9. Vyāyāmaśakti: exercise capacity

10. Vaya: age

This tenfold assessment is the most useful diagnostic tool in Ayurveda. It gives comprehensive idea of health and provides the prognosis of future health. Relevance of tenfold assessment with sports can be explained with its relationship with the trifold classification of Bala as follows:

Table 4: Relationship between types of bala and assessment of of Bala

Trifold classification of Bala	Tenfold assessment factors
Sahaja Bala (Innate strength)	Prakṛti , Vikṛuti, Sāratā, satva, Saṁahanan, Pramāṇa
Kālaaja Bala (seasonal variant of strength)	Vaya
Yuktikṛta Bala	Āhārashaktī, Vyāyāmaśakti, Sātmya

Along with this presence or absence of Balopkāraka bhāva (Favorable factors of strength) needs to be taken in to consideration.

Importance of Assessment of strength:

Bala is considered as one of most important factor in assessment since the ability to perform all activities is dependent on it. Importance of proper assessment of Bala is explained by Suśruta as follows.

बलं अभिहितगुणं, दौर्बल्यं तु स्वभावदोषजरादिभिरवेक्षितव्यम् ।

यस्माद्बलवतःसर्वक्रियाप्रवृत्तिस्तस्माद्बलमेव प्रधानाधिकरणम् ।

सु.सू.३५/३५

Bala is the outcome of Oja which is the purest part of all body constituents. Bala is responsible for all physical, mental, intellectual operations and efficiency. Hence it is the important and stable factor for assessment. Whereas daurbalya is temporary state caused by vitiation of doṣa, disease conditions etc. Hence assessment of baseline Bala is the most important factor. Restoration or improvement of Bala is the goal of treatment.

As we have seen strength or power is a complex phenomenon which is the outcome of metabolism of all body constituent and it is the functional ability or efficiency. Hence it needs to be thoroughly assessed taking both these aspects into consideration. To avoid confusions method of assessment of Bala is directed in Āyurveda detail.

केचित् कृशाः प्राणवन्तः स्थुलाश्चाल्पबला नराः ।

तस्मात् स्थिरत्वं व्यायामैर्बलं वैद्यः प्रतर्कयेत् ॥

सु.चि.३५/३६

Sometimes a person with lean body can be stronger and someone with big broad body can be weaker. Hence stability should be tested with the help of measuring of exercise capacity.

बलं कर्मसाधनशक्तिव्यायामानुमेया ।

सु. सू १/२८

strength is the functional ability of a person which should be assessed with the help of measure of exercise capacity.

After establishing the importance of assessment and importance of strength in assessment we will understand the significance of each factor of Daṣavidha Parīkṣā (Tenfold assessment) with respect to strength.

1) Prakṛti :

तत्र प्रकृत्यादीन् भावान् अनुव्याख्यास्यामः । तद्यथा शुक्रशोणितप्रकृति कालगर्भाशयप्रकृति आतुराहारविहारप्रकृति महाभूतविकारप्रकृति च गर्भशरीरमपेक्षते । एतानि हि येन येन दोषेणाधिकेनैकानामेकेन वा समनुबध्यते तेन तेन हि दोषेण गर्भोऽनुबध्यते, ततः सा सा प्रकृतिरुच्यते मनुष्याणां गर्भादिप्रवृत्तां तस्मात् श्लेष्मलाः प्रकृत्या केचित् पित्तला केचित् वातलाः केचित् संसृष्टाः केचित् भवन्ति ॥

च.वि. ८/९५

Prakṛti is the inherent characteristic of an individual refers to the genetically determined physical and mental makeup. It is determined by sperms and ovum, condition of uterus and dominance of doṣa at the time of conception and during pregnancy determine the Prakṛti of an individual. Food and lifestyle regimens of the mother aggravate doṣas and determine the physical constitution.

According to this Prakṛti of an individual might be śleśmal, pittala, vātala and with dominance of two doṣa. Equilibrium of all three doṣa is called samdhātava.

Details of characters of each Prakṛti are described in all texts of Āyurveda in almost same way. These characteristics include some important anatomical, physiological and psychological characteristics. Anatomical characters include overall physique, skin type, complexion, colour and shape of eyes, type and colour of hair, shape of joints, gait and muscle tone.

Physiological characters include appetite, hunger, digestion thirst, urine, stool, sweat and temperature of body.

Psychological features include memory, tolerance, courage, will power.

Individual having śleśmal Prakṛti is endowed with excellence of strength, wealth, knowledge, energy, peace and longevity. Pitta Prakṛti is characterized with moderate strength, moderate span of life, knowledge. Sharpness of memory, voice, courage, gait are the special features of Pittala. They produce ample sweat, urine stool which smells characteristically.

Individuals with vāta Prakṛti are having less strength shorter span of life, less amount of wealth and accessories of life. But they are featured with lean physique and speed.

Individual having constitution dominated by the combination of two doṣa are characterized by the combination of the manifestations of respective doṣa. Samdhātava or equilibrium is endowed with good qualities of all three types of individuals. Samdhātava is one of the rarest type of constitution these days.

Prakṛti is the Prākṛta Bhāva (Innate Factor)

Prakṛti is one of the innate factor and it remains unchanged throughout the life. This constitution of doṣa does not affect with vitiation and does not harm each other and individual.

प्रकोपो वाऽन्यथाभावो क्षयो वा नोयजायते ।

प्रकृतिनां स्वभावेन जायते तु गतायुषः ॥

सु. शा ४/७८

विषजातो यथा कीटो न विषेण विपद्यते ।

तद्वत्प्रकृतयो मर्त्यं शक्नुवन्ति न बाधितुम् ॥

सु. शा ४/८०९

Prakṛti and Sahaja Bala :

Prakṛti is one of the factor responsible for deciding one's innate strength, efficiency and tolerance of stress. Doṣa dominance at time of conception is responsible physical, physiological and psychological characteristics of an individual which decides the ability to with stand stress and physical power too. When we observe the concept of fitness in sports these qualities are

mandatory to become sportsmen. Now we will closely observe the fitness components of sports and its relationship with characters of doṣa and Prakṛti.

Table 5: Relationship between components of physical fitness and Prakṛti

Sr.No.	Fitness Component	Meaning	Āyurveda Interpretation.
1.	Cardio respiratory and muscular Endurance	The capacity to continue in or withstand difficult process or wear and tear Tolerance.	Characteristic of Kapha doṣa.
2.	Body composition	Well-nourished body composition consisting of strong muscular build.	Characteristic of sāra guṇa of Kapha doṣa and Mansa Sāratā सारसंहतास्थिरशरीर उपचितपरिपूर्णसर्वांग ।
3.	Strength	Physical strength	Characteristic of Kapha Prakṛti .
4	Flexibility	The capacity of a joint, muscle to move through its full range of motion	Quality of Kapha doṣa and pitta doṣa सुश्लिष्टसारसन्धिबंधन शिथिलमृदुसन्धिबंधन
5.	Agility	The ability to quickly change body position or direction.	Characteristic of Vāta, Pitta attribute of Laghu and cal. Tikshṇagati Guṇa.
6.	Speed	Speed is the ability to move quickly across the ground or to move limbs quickly.	Characteristic of Vāta and Pitta. (चपलगतिचेष्टाहारव्याहार) तीक्ष्णपराक्रमः

7	Balance	Ability to stay upright or control body movements	Attribute of Guru and sthira guna of Kapha Doṣa.
8	Co-ordination	Ability to move two or more body parts under control smoothly and efficiently	Nature of Kapha and pitta Doṣa
9	Reaction time	Ability to respond quickly to a stimulus	Feature of Pitta Doṣa and Vāta Doṣa.

Thus, assessment of Prakṛti gives directions of fitness components of sports. As the fitness is outcome of all components altogether, similarly Prakṛti is the combination of doṣa together. Assessment of Prakṛti is directive of innate physical strength and as sporting ability as well.

2) Vikruti (Examination of Anomaly)

A patient must be examined in respect of Vikruti as well.

विकृतितश्चेति विकृतिरुच्यते विकारः । तत्र विकार हेतु दुष्य दोष प्रकृति देश काल बलविशेषलिङ्गतश्च परीक्षेत न ह्यन्तरेण हेत्वादिनां बलविशेष व्याधिबलविशेषोपलब्धि ।

च वि ८/१०१

The morbidity manifestation with reference to specific causative factor, doṣa, dhātu involved in the pathogenesis, Prakṛti of an individual, deśa (habitat) Kāla (season) Bala (Strength), of a person and symptoms. it is not possible to understand the intensity of the disease without assessing these factors.

It the afflicted doṣa and dhātu, physical constitution of patient (Prakṛti), deśa, Kāla, Bala of an individual resemble that of disease in intensity of causative factors and symptoms are too strong, then the disease manifested is strong. The Vikruti assessment is stated for doṣa Bala of at the patient. Based on these factors Vyādhi (disease) is considered easily curable, moderately curable and incurable.

In the context of sports assessment this Vikruti assessment is crucially important to prevent possible future prognosis of the disease due to Vyāyāma. To understand the health risk

factors for an athlete. Vikruti assessment is necessary and it can be one of the factor of hindering the performance. Hence to exclude these possibilities Vikruti assessment is conceal important for athletes.

Present Physical, Physiological diseases, congenital anomalies, recurrent illnesses, pre-conceptual anomalies need to be assessed in assessment related for sports.

3) **Sāratā: (Assessment of Purity/essence of body constituents)**

Sāratā is the special factor mentioned for assessment quantity of Bala i.e. physical strength/power of resistance

सारतश्चेति साराण्यष्टौ पुरुषाणां बलमानविशेषज्ञानार्थमुपदिश्यन्ते तद्यथा त्वग्रक्तमांस मेदोऽस्थिमज्जाशुक्रसत्वानीति ॥

च वि ८/१०२

Sāratā means purity. It is defined as the state of body composition depending upon the purest form of body constituents and mind. Physical and psychological characteristic of different sāra are described in saṁhitā. It reflects the the best state of body constituents in the form of structure and function. It is called as tissue quality or tissue vitality.

Sāratā is the most reliable and practical method of assessment of quantity of strength (Bala). While describing the features of sāra carakācārya has used the term Balvaṅta for three dhātu sāra i.e. Mansa, majjā and śukra to denote best of physical strength (Bala). Based on predominance of sāratā of each body constituent classification is done as Utama sāra, madhyam sāra and asāra. Satva sāra is based on psychological features.

Caraka has described Sāratā examination under ten-fold assessment method, significance of this examination is mentioned as follows:

कथं नु शरीरमात्रदर्शनादेव भिषज्युह्येदयमुपचितत्वाद्बलवान्, अयमल्पबला
कृशत्वात्, महाबलोडयं महाशरीरत्वात्, अयमल्पशरीरत्वादल्पबल इति, दृश्यन्ते ह्यल्पशरीराः कृशाश्चैके बलवन्तः तत्र
पिपीलिकाभारहरणवत् सिद्धीः॥

च वि ८/११५

It has emphasized that sometimes physicians may take a wrong decision from appearance of the patient such as strong because of being corpulent and weak because of leanness. But factually it is observed that some persons with lean body possess better strength like ants carrying heavy load. Hence eight types of sāra should be assessed in terms of relative quality as Utama (Best) Sara Puruṣa, madhyam and Asāra.

a) **Features of Sarvasāra:**

These persons have all bod constituents in abundance and of good quality. They are endowed with great physical strength, absolute happiness, endurance and tolerance to stress, good mental abilities like, confidence, firm and balanced body, well-balanced gait, resonant good quality voice, wealth, supremacy, better immunity and longevity.

b) **Features of Madhyama Sara:**

Moderate amount of different sara possess above characteristics in moderations.

c) **Features of Asāra:**

They possess least amount of body constituent's and quality is not purest hence they do not possess above features prominently.

For assessment of amount of strength individual body constituent needs to be studied separately. Each body constituent is endowed with specific function, physical feature and facets of fitness as we have observed in Prakṛti . Along with specifications of eight subtypes of sāra described by Caraka, features described by Suśruta is also studied to understand the assessment thoroughly. Based on these observations its relevance with sports related fitness is analysed and applied in designing of assessment module of innate strength of sports person.

Features of eight subtypes of sāra are described in Caraka saṁhitā as follows:

तत्र स्निग्धश्लक्ष्णमृदुप्रसन्न सूक्ष्माल्पगम्भीर सुकुमारलोमा सप्रभेव च त्वक्साराणाम् । सा सारता सुखसौभाग्यैश्वर्योपभोगबुद्धिदयारोग्यप्रहर्षणन्युयुष्यत्वं चाचष्टे ।

कर्णाक्षिमुखजिह्वा नासौष्ठपाणिपादतलनखललाट मेहनं स्निग्धरक्तवर्ण श्रीमद्भ्राजिष्णु रक्तसाराणाम्। सा सारता सुखमुद्धतां मेधां मनस्वितं सौकुमार्यमनतिबलमक्लेशसहिष्णुत्वमुष्णासहिष्णुत्वं चाचष्टे ।

मांस सारता :

शङ्खललाट कृकाटिकाक्षिगण्डहनुग्रीवास्कन्धोरकक्षवक्ष : पाणिपादसन्धय स्थिरगुरु शुभमांसोपाचितामांससाराणाम् । सा सारता क्षमां धृतिमलौल्यं वित्तं विद्यां सुखमार्जवमारोग्यं बलमायुश्चदीर्घमाचष्टे ॥ १०५ ॥

मेदसारता :

वर्णस्वरनेत्रकेशलोमनखदन्तौष्ठ मूत्रपुरीषेषु विशेषतः स्नेहो मेदसाराणाम् । सा सारता वित्तैश्वर्यसुखोपभोगप्रदानान्यार्जवं सुकुमारोपचारतां चाचष्टे ॥ १०६ ॥

अस्थिसारता :

पाष्णिगुल्फज्वान्वरत्निजत्रुचिबुकशिरः पर्वस्थुलाः स्थूलास्थिनखदन्ताश्चास्थिसारा । ते महोत्साहाः क्रियावन्तः क्लेशसहाः सारस्थिरशरीराभवन्त्यायुष्मन्तश्च ॥ १०७ ॥

मज्जासारता :

मृद्वङ्गा बलवन्तः स्निग्धवर्णस्वराः स्थुलदीर्घवृत्तसन्धयश्च मज्जसाराः । ते दीर्घायुषो बलवन्तश्चुतवित्तविज्ञानापत्यसंमानभाजश्च भवन्ति ॥१०८ ॥

शुक्रसारता :

सौम्याःसौम्यप्रेक्षिणः क्षीरपूर्णलोचना इव प्रहर्षबहुलाः स्निग्धवृत्तसारसमसंहत शिखरदशनाः प्रसन्नस्निग्धवर्णस्वरा भ्राजिष्णवो महास्फिचश्च शुक्रसाराः । ते स्त्रीप्रियोपभोगा बलवन्तसुखैश्वर्यारोग्यवित्त संमानापत्यभाजश्च भवन्ति ॥

सत्वसारः

स्मृतिमन्तो भक्तिमन्तः कृतज्ञाः प्राज्ञाः शुचयो महोत्साह । दक्षा धीरा समरविक्रान्तयोधिनस्त्यक्तविषादाः सुव्यवास्थितगतिगम्भीरबुद्धिचेष्टाः कल्याणा भिनिवेशिनश्च सत्वसाराः । तेषां स्वलक्षणैरेव गुणा व्याख्याता ।

च वि ८/१०३:११०

अथ सारान् वक्ष्यामः स्मृतिभक्तिप्रज्ञाशौचशौर्ययेतं कल्याणाभिनिवेशं
सत्वसारं विदयात् । स्निग्धसंहतश्वेतास्थिदन्तनखं बहुलकामप्रजं शुक्रेण
अकृशमुत्तमबलं स्निग्धगम्भीरस्वरं सौभाग्योपपन्नं महानेत्रं च मज्जाः ।
महाशिरस्कन्धं दृढदन्तहन्वस्थिनमस्थिभिः ।

स्निग्धमुत्रस्वेदस्वरं बृहत्शरीरमायासासहिष्णुं मेदसा।

अच्छिद्रगात्रं गुढास्थिसन्धि मांसोपचितं च मांसेन।

स्निग्धताम्रनखनयनतालुजिह्वौष्ठपाणिपादतलं रक्तेन

सुप्रसन्न मदुत्वग्रोमाणं त्वकसारं विदयात् । एषां पूर्वपूर्वप्रधानमायुः सौभाग्यैर्योरिति ॥

सु सू ३५/१६

Suśrutaa has considered anatomical aspect of body constituents while assessing Sāratā. For this examination anthropometric measures should be used wisely by physictan.

Sāratā : Sahaja Bala-sports Fitness:

Sāratā is fine factor responsible for deciding one's innate strength and ability to withstand stress. These abilities specifically denote the sporting ability and fitness.

Sāratā can be considered as interpretation of body composition. The assessment of body composition is an essential measure of health and fitness in athletes. The body composition is a factor contributing to sports performance. Assessment of body composition is an important component of monitoring athletes to improve their performance. It is an important to appreciate the nutritional status and monitoring the treatment.

Body fat percentage, muscle percentage, bone-density distribution of fat and muscles, are the important markers in body composition assessment. Height, weight, BMI, Hip waist ratio, chest circumference, skinfold thickness measurements are the anthropometrical assessment markers of body composition.

An ideal body composition comprises of proportionate height, weight ratio body mass index, less percentage of fat, strong bone density and well-developed, well-distributed muscle

bulk. Fat percentage is directly related with aerobic capacity i.e. endurance which is the measure of exercise tolerance capacity over the period.

Sāratā is the assessment of purity of body constituents quantitatively and functionally. In Sāratā the component of mind is also considered important. Relevance of concept of Sāratā with sports can be explained as follows:

Table 6: Relevance of features of sāratā with sports

Sr.No.	Sāratā	Physical features	Functional Features	Relevance with sports.
1	Twak/Rasa	Skin complexion less amount of body hair unctuous skin	Health, Better, intell ectual abilities Knowledge Happiness.	Important in assessment of health.
2.	Blood Rakta	Redness of eyes, tongue, ears, hand feet, hails, Unctous skin and bright skin complexion.	Sharp memory, High minded, but physically, fragile and intolerant to heat, stress Not very strong physically	Skill related fitness and mental abilities are useful in skill games like chess snooker etc. Not fit for outdoor indurance events.
3.	Māṅsa	Forehead, chin neck, shoulder chest and	Abundance of Knowledge Best	Well-developed

		Hand and leg joints are big and covered with musculature	in strength and tolerance ability, health and Immunity and longevity	well distributed muscle bulk is essential and directly related to sporting ability Mānsa-Sāratā is good for strength endurance and speed events
4	Meda	Unctousness/oiliness of hair, skin, eyes, skin, softness of voice Big body	Fragile blessed with wealth happiness.	Not able to tolerate stress, exercise, heat. Not suitable for strength sports outdoor sports
5	Asthi	Ankle, heel, knee elbow, khin and finger joints are big and prominent, long bones, teeth are big, stout strong.	Great enthusiasm readiness to work, Tolerant to exertion, stress. Stable, strong physique. longevity	Best for Sports especially endurance, long duration sports. Ideal bone density and

				physique for sports.
6	Majjā	Big pleasant eyes, all joints are big, round well covered with muscles.	Not very thin but well-developed physique. Great strength knowledge, luck, wealth, fame.	Majja denotes Bone marrow Good bone density strength, endurance. Hence good for sports and they are endowed with luck and fame.
7.	Śukra	Nice soft eyes, equal dentures. soft voice. good complexion. Broad hips	Endowed with great strength, wealth, fame happiness.	Śukra is final body constituent and seat of Oja hence endowed great physical strength ability, wealth fame and good progeny

8) **Mind:** Memory, clarity of thoughts, cleanliness, neatness, great enthusiasm, mental alertness, stability, brave heart, positive attitude not jealous with anyone, knowledge, Intellectual abilities, good leadership skill, engaged in good work. Well- balanced gait and actions. Ideal for sports, can become good leader in sports etc.

Sāratā assessment is included in the module of assessment of Bala which leads to innate sporting ability assessment.

4) **Samāhanan- (Compactness of body constitution):**

Continuation with Sāratā assessment, Samāhanan is another factor in ten-fold assessment in terms of body constitution. It is about compactness of the body.

संहननश्चेति संहननं, संहतिः संयोजनमित्येते कोऽर्थः तत्र समसुविभक्तास्थि, सुबद्धसन्धि सुनिविष्टमांसशोणितं सुसंहतं शरीरमुच्यते । तत्र सुसंहतशरीराः पुरुषा बलवन्तः विपर्ययेणाल्पबला मध्यत्वात् संहननस्य मध्यबला भवन्ति ।

च वि ८/११६

संहतिरितिः निबिडसन्धानतेत्यर्थः ।

Samāhanan is proportionate distribution of body constituents including well developed bones, joints and musculature to give strong and firm built. As a result, it gives rise to maximum strength. Moderate proportion of these constituents is called medium Samāhanan and possess moderate strength and disproportionate body constituents is cause of weaker body and weak strength.

Factors mentioned in Samāhanan are the symmetrical, proportionate, well developed bones, firmly mobile joints with well covered musculature. All these joints produce kinesiological smooth motions of body. It is required in all sports. Hence Samāhanan assessment is importance in terms of sports and fitness.

5) **Pramānam: (Anthropometry –Examination of measurement of bodily organs)**

This is anthropometrical measurement of body and organs. A person who possesses proper measurements is endowed with strength, Longevity, ojus. If the measurements are not proportionate and on either higher or lower side the individual does not possess better strength.

For clinical assessment it is subdivided into height, length and breadth of organs. Standard measures of organs are considered pravara Pramāṇa, moderate deviation to standard measures is called Madhyama Pramāṇa and lower measurement than standard measures is called avara Pramāṇa.

Overall height, weight proportion, bone length and muscle mass play major part in Bala Parīkṣā as these constituents are directly related to strength. Anthropometrical measures are considered very important in assessment to identify sporting talent.

Pramāṇa assessment is the factor of Sahaja Bala, growth, development and identification of young athletes. Hence it is considered important in Sahaja Bala assessment of an athlete.

6) Sātmya: (Habituation) Sātmya means purposive habituation factors considering health, basic body constitution, person habitual for maximum factor can adapt and resist well. It is explained as follows in texts.

सात्म्यं नाम तद्यत् सातत्येनोपसेव्यमानमुपशेते । तत्र ये घृततैलक्षीरमांसरस सात्म्याः सर्वरससात्म्याश्च ते बलवन्तः क्लेशसहाचिरजिविनश्च भवन्ति, रुक्षसात्म्या एकरससात्म्याश्च ये ते प्रायेणाल्पबला अल्पक्लेशसहा अल्पायुषोऽल्पसाधनाश्च भवन्ति व्यामिश्रसात्म्यस्तु ये ते मध्यबलाः सात्म्यनिमित्ततो भवन्ति ।

च.वि. ८/११८

Sātmya is the habituation of certain factors by continuous consumption. In Caraka samhītā habituation of foods items like ghee, oil, milk, meat and all six tastes are considered the best. One who is habitual to all six tastes is considered strong, tolerant to stress and endowed with longevity. One who is habitual to only one taste and type of food are weaker, less tolerant. Those are tolerant to few tastes and food possess medium strength.

In Suśruta samhītā other factors for which habituation can be developed are described.

सात्म्यानि तु देशकालजात्युर्तुरोगव्यायामोदकदिवास्वप्न रसप्रभृतीनि प्रकृतिविरुद्धान्यपि यान्यबाधकराणि भवन्ति।

सु. सू. ३५/३९

यो रसः कल्पते यस्य सुखायैव निषेवितः ।

व्यायामजातमन्यद्वा यत् सात्म्यमिति निर्दिशेत ॥

सु सू ३५/४०

सात्म्यं नाम सुखं यत् करोति तदुच्यते ।

व्यायामस्त्रिविधः कायवाङ्मनोभेदात् ।

According to Suśruta, habitat, time, season, natural instinct, water and food, exercise, sleeping during day, tastes, can be made habitual by continuous consumption. Though some factors are opposite to Prakṛti are not favourable naturally those factors also become harmless with habituation.

In commentary Sātmya is defined as factors which create feeling of comfort or happiness are called as Sātmya This is explained in detail in commentary by dalhaṇ as follows:

Deśa Sātmya is classified as habitat and patient body. Patient body habituation is of two types first is all over body and another is specific organs e.g. consumption of madhura rasa for entire body and consumption of keshya items are good for hair growth.

Habitat is of two types viz dry (Jāṅgala) and watery (Ānupa). These habitats grow specific foods and people staying there are habitual for it. But, by practice habituation to food and weather of another habitat can be developed.

Jātisātmya: It denotes to natural instinct, naturally human are vegetarian but habituation to non-vegetarian foods can be developed by practice.

Seasonal habituation is developing condusiveness to foods which are not favourable to the ongoing season.

Exercise/Physical Stress: It can be made habitual to constitution which is not naturally tolerant to stress or exercise e.g. naturally pitta, vāta Prakṛti are not much tolerant to physical exertion but by regular practice and progressive loading its habituation can be developed over the time and it becomes harmless by practice. Exercise habituation is of three types physical exercise, mental exercises and voice culture.

Udak: Water and food condusiveness can be developed by practice. Sleeping during daytime is considered contraindicated except in summer. But by regular practice it becomes habitual for specific conditions like staying awake at night, physical exercise etc.

In this way habituation process is explained in Suśruta saṁhitā.

Sātmya in the context of Sports:

The concept of Sātmya is very important in terms of sports in assessment and strategic planning of lifestyle for athletes.

In assessment we cannot exclude certain player for just some basic constitutions. For those athletes progressive overloading of exercise can make them tolerant towards exercise and stress. Travelling is inevitable part of player's life for training and competition. They have to adapt with different seasonal conditions, foods and sleeping patterns. This concept of habituation is very useful while planning food, treatment and lifestyle regime for athletes. Habituation for exercise can be developed with continuous practice. In this way the concept of Sātmya is useful and relevant to sports field.

7) **Sattva Parīksā:**

Satva means mind and it regulates the body because it is associated with soul. Depending upon its strength satva is of three types pravara, madhyama and avara satva according to its abilities.

सत्त्वतश्चेति सत्त्वमुच्यते मनः । तच्छरीरस्य तन्त्रकमात्मसंयोगात् ।

तत्त्रिविधं प्रवरं मध्यम, अवरं चेति । तत्र प्रवरसत्त्वाः सत्त्वसारास्ते सारेषूपदिष्टाः स्वल्पशरीरा ह्यपि ते निजागन्तुनिमित्तास्तु महतीष्वपिपीडास्वव्यथा दृश्यन्ते सत्त्वगुणवैशेष्यातः मध्यसत्त्वास्त्वपरानात्मन्युपनिधायसंस्तभ्ययन्त्यात्मनाऽऽत्मानं परैर्वाऽपि संस्तभ्यन्ते, हीनसत्त्वास्तु नात्मना नापि परैः सत्त्वबलं प्रतिशक्यन्ते उपस्तम्भयितुं, महाशरीरा ह्यपि ते स्वल्पानामपि वेदनानामसहा दृश्यन्ते, सन्निहितभयशोकलोभमोहमाना रौद्रभैरवदिष्टबीभत्सविकृतसंकथास्वपि च पशुपुरुषमांसशोणितानि चावेश्य विषादवैवर्ष्यं मुर्च्छोन्मादभ्रमप्रपतनानामन्यतममाप्नुवन्त्यथवा मरणमिति ॥

च वि ८/११९

Pravara Sattva : sattva sāra is endowed with all mental faculties at its best. Lean physique person with excellent mental faculties can tolerate serious exogenous and endogenous difficulty or stress easily. They are having Greater tolerance to pain and adaptability.

Madhyama Sattva : Moderate mental abilities can tolerate stronger therapies producing harmful effects on the body. Leaner physique having moderate mental faculties tolerate exogenous and endogenous stress or diseases with much difficulty. They have Moderate tolerance to pain and adaptability.

Avara Sattva : Inferior mental abilities. They cannot sustain difficult situations. Despite having a good strong physique they cannot sustain fear grief, ego etc. On occasion of seeing fearful incidences of flesh blood they fall victims to pallor, fainting, falling to the ground. They have less tolerance capacity and adaptability.

Mind controls body by its association with the intellect or self. Among them pravara satva are the satva sāra having possess the greater physical strength and tolerance to stress. Madhyam satva are having moderate mental abilities can sustain stress to moderate level and have moderate physical strength. Avara satva are having poor mental abilities and cannot sustain stress despite having strong physique.

Sattva and Sports:

Sports performance is an outcome of all round fitness inclusive of physical, mental, intellectual abilities. Role of mind in performance, tolerance level and physical strength is vividly explained in Āyurveda hence assessment of mental abilities is essential in sports and

fitness. It is the factor responsible for sahaja Bala (innate strength) which can be nurtured but can not changed.

8) **Āhāraśakti: (Appetite/digestive ability)**

Digestive capacity of an individual can be examined by two ways, i.e. abhyavaharaṇa śaktī (capacity of ingestion), and jaraṇa śaktī (capacity of digestion).

आहारशक्तितश्चेति आहारशक्तिरभ्यवहरणशक्त्या जरणशक्त्या च परीक्ष्याः बलायुषी ह्याहारायत्ते ।

च वि ८/१२०

Physical strength (Bala) longevity of life of an individual depends on food. It depends on agni (digestive fire) residing in the body. If an individual possesses good digestive capacity, he can metabolize food and develop body constituents of good quality and quantity also person with good digestive ability possess better immunity for diseases.

Āhāraśaktī is assessed in two ways by assessing the ability to ingest food at a time and jaraṇaśakti (digestive capacity) it is assessed with an ability to digest multiple meals.

Relevance with sports:

Bala is the essential factor in sports. It depends on purity of body constituents and oja. Purity of body constituents is directly dependant on the digestion of food.

Āhāra is one of the most important part of Yuktiṛta Bala development. Hence assessment of Āhāraśakti is essential in the context of athletes. A person with weaker digestive ability cannot have pure body constituents. Immunity, longevity also depend on digestive capacity of an individual. Hence it is one of the important assessment in the context of sports.

9) **Vyāyāmaśakti (Exercise capacity)**

Vyāyāmaśakti (exercise capacity) is one of the most important factors of assessment of strength (Bala). It is tested from ability to perform exercise vyāyāma śakti is competent for assessing Bala from exercise capacity, one's trifold strength can be inferred/ assessed.

व्यायामशक्तिरपि कर्मशक्त्या परीक्ष्या । कर्मशक्त्या ह्यनुमीयते बलत्रैविध्यम् ।

च.वि. ८/१२१

Exercise capacity should be tested in two ways, i.e. ability to sustain maximum exercise load and endurance of exercise over time. In Carak saṁhitā for assessment of exercise ability activities like lifting exercise, digging well have been directed.

Another important factor assessment of exercise ability is tolerance of exercise. It can be tested with the ability of a person to recover from sustained exercise and effects of sustained exercise should be assessed.

Bala is the outcome oja, which is a functional ability of a person to undergo physical activities and its tolerance. Visual assessment of physique may mislead to interpret strength in a wrong way. Hence assessment of exercise capacity is the best method to assess one's strength (Bala).

Significance in sports:

Assessment of exercise capacity is the crucial in sports. It gives fair idea about strength and weakness of performer. In sports specific test batteries are applied for assessment of fitness components precisely. It gives idea about one's maximum ability to sustain load, it is important in planning training program and helpful in monitoring the progress of an athlete. Person with pravara vyāyāma śakti is one who can tolerate maximum exercise load, over the longer duration of time and recover quickly from sustained exertion without any effects on body.

Madhyama vyāyāma śakti:

A person can tolerate moderate exercise load for moderate duration. He may take time to recover form exercise and might get affected with sustained exercise.

Avar Vyāyāmaśakti:

A person cannot tolerate low intensity of exercise and also recovers very slowly from sustained exercise with having painful effects on the body.

Hence Vyāyāmaśakti assessment is the most important assessment in terms of sports.

10) Vaya – (age)

Vaya (Age) is defined as the state of the body corresponding to the length of time that has passed since birth. Age is broadly divided as Bāla (childhood) Madhya (middle age) and jīrṇa (old age)

In the context of Kālaja Bala, the factor age is explained in detail in earlier part of this chapter.

In this way tenfold assessment is explained in Āyurveda. It is very much systemic method of understanding the span of life, strength of a person, problem causes of strength and diagnosis of diseases. The module of assessment of trividha bala is designed based on the tenfold assessment method and Balopakāraka a bhāva are taken into consideration.

3.4.2:

Assessment Module of Trividha Bala With Special Relevance to Sports:

We have studied the concept of Bala from Sanskrit literature comprising of Vaidika literature, Āyurveda. We have explored the relevance of concept of Bala with Vyāyāma, Āyurveda and present Krīḍāvaidyaka (Sports medicine). We have explored the concept of Trividha Bala in Āyurveda and its context with sports. Now we will explore the practical application of concept of Bala in the sports. As explained assessment is the very important and primary factor before application.

Hence based on Daśavidha Parīkṣā (Tenfold assessment) and Balopakāraka a bhāva (Favorable factors of strength) researcher has developed module of assessment of Trividha Bala with special relevance with sports.

Methodology of Assessment Module Design:

After understanding the importance of assessment in Āyurveda through detail study of Tenfold assessment method and need of assessment in the sports field Assessment module of Trividha Bala is designed. It is based on Tenfold assessment method and Balopakāraka a bhāva.

Title:

Trividha Bala Parīkṣāṅ module for sports person.

Aim:

To design the comprehensive module for assessment of Trividha Bala of an individual.

Objectives:

- i) To understand the need of assessment of Trividha Bala in sports persons.
- ii) To design the Trividha Bala assessment module to which will be applicable for sports persons.
- iii) To study the practical applicability of Trividha Bala Parīkṣāṅ module with sports field.

Module Design:

Variables of assessment are trividha bala

- 1) sahaja Bala
- 2) Kālaja Bala
- 3) Factors involved in Yuktikṛta Bala

Factors of Assessment:

Factors involved in assessment of Trividha Bala are factors involved in Tenfold examination of Āturdeśa i.e patient. In addition to this Balopkarak Bhāva (Favourable factors of strength) described by Caraka samite are taken into consideration.

Factors enlisted as follows -

- 1) Prakṛti (constitution)
- 2) Vikṛti (Anomaly assessment)
- 3) Sāratā (Purity/essence of body constitution)
- 4) Saṁahanan- compactness.
- 5) Pramāṇa - Anthropometrical measures
- 6) Sātmya - Habituation.
- 7) Satva - Mental faculties
- 8) Āhārashakti – Ability of digestion
- 9) Vyāyāmaśakti- Exercise capacity
- 10) Vaya - Age.
- 11) Balopakāraka a Bhāva (strength facilitation factors)

Methods of Assessment:

Trifold fourfold assessment method is described in Āyurveda to examination of patient were used for assessment. It includes following assessments.

- 1) Trifold Assessment – Trividha Parīkṣā includes Darśana (Direct observation), sparśanaa (palpation) and praśna (Questioning)
- 2) Fourfold method - It includes four Pramāṇa i.e. Pratyakṣa (Direct observation), Anumāna (inference method) Āptopadeśa (as described in texts) Yukti (collective organization of knowledge and methods).

Table 7: Tenfold method of assessment of Bala

Sr.No.	Assessment factor	Method	Variable assessed
1	Prakṛti	Trifold assessment Āptopadeśa	Sahaja Bala
2	Vikruti	Trifold assessment	Sahaja Bala
3	Sāratā	Trifold assessment Āptopadeśa	Sahaja Bala

4	Samahanan	Darśana, sparśanaa	Sahaja Bala Yuktikṛta Bala
5	Pramāṇa	Darśana sparśanaa Āptopadeśa	Sahaja Bala
6	Sātmya	Praśna, sparśana Anumāna	Yuktikṛta Bala Kālaja Bala
7	Sattva	Praśna, Anumāna	Sahaja Bala
8	Āhāraśakti	Darśana, sparśana, praśna, Anumāna	Yuktikṛta Bala
9	Vyāyāmaśakti	Darśana, sparśana, praśna, Anumāna	Yuktikṛta Bala
10	Vaya	Age praśna	Kālaja Bala
11	Balopakāraka a Bhāva	Darśana, praśna, Anumāna	Yuktikṛta Bala Sahaja Bala

Module Design:

Based on Description of factors involved in tenfold examination and using threefold and fourfold assessment methods, Trividha Bala assessment module is designed. To maintain the uniformity in data collection and to bring objectivity in assessment scoring pattern is followed.

The assessment tool is divided into 4 domains as follows.

Table 8: Domains involved in assessment module of Bala

Domain	I	II	III	IV
Factors	Sahaja Bala Prakṛti Sāratā Sattva Vaya Balopakāraka a Bhāva.	Kālaja Bala Present health Antenetal health family health Vikṛti	Yuktikṛta Bala Āhāra Vihāra Sātmya	Vyāyāmaśakti Exercise Capacity Exercise Tolerance
Score	50	30	10	10

This test is designed in Marathi Language for convenience. Assessment of parents and information about gestational health, parental health and previous health history is collected by question answer method from parents.

Gradation scale is designed based on scoring given by Ayurveda physicians. Based on the scoring gradation of Bala is given as

Grade A Pravara Bala

Grade B+,B Madhyam Bala

Grade C- Avara Bala

Composition of Gradation of Bala:

Bala Interpretation

1) Pravara Bala :

- Comprises of Kapha Prakṛti , Kapha Vāta Prakṛti ,
- Possess Utama sārātā Mānsa, Asthi, Majja, Śukra, Satva
- Absence of any physical, congenital anomaly or diseases,
- Habituation of maximum tastes and food, water, habitat, parental health optimum.
- Vyāyāmaśakti: can sustain given exercise load and recover quickly from sustained exertion without or very less effects of exertion.
- They are suitable for all sports specially for strength endurance and power events like wrestling, Kabaddi, throwing events., football, cricket etc.
- They have innate physical sporting ability and mental facilities hence tolerance ability is high.
- Need less support of Yuktikṛta bala regime.

2. Madhyam Bala: Interpretation

- comprises of Kapha Pitta, Pitta Vāta and Vāta Kapha dominance Prakṛti .
- Moderate to best Sārātā of Mānsa, Asthi, Majja, śukra dhātu. Rakta sārātā medium or uttama, Meda sarata-Madhyama. Moderate Sattva Sārātā.
- Moderate habituation to food, exercise, heat and habitat.
- Parental health optimum.
- For physical disability,

- Vyayamśakti Moderate time required for recovery and get affected with bodily symptoms.
- Suitable for speed, quality medium endurance events like kho-kho, middle distance athletics, jumping events, Badminton, volleyball, hockey, cricket. Skill based events like gymnastics, table tennis, shooting, chess and archery.
- They have moderate innate sporting ability hence enquire proper and constant Yuktikṛta bala.
- Needs progressive habituation of exercise

3. Avara Bala: Interpretation

- Vāta, Pitta Prakṛti, Pitta Kapha Prakṛti .
- Rasa, Raska, Meda Sāratā Uttam
 - Presence of minor physical anomaly or functional problem.
 - History of Major illness/Gestational health problems.
 - Parental health- poor/optimum.
 - Poor habituation of heat, exertion, food.
 - Āhāraśakti-Poor.
 - Vyāyamaśakti-Poor ability to sustain exercise load and get affected with exercise and require prolong time to recover.
 - Not very suitable for sports as they have very less innate fitness abilities and tolerance capacity hence can be selected for skill events/ indoor events like Yoga, shooting, archery etc.
 - They need progressive habituation of exercise food with special medical care.
 - If they are having any congenital anomaly should be excluded from sports.
 - Aggressive Yuktikṛta Bala regime and constant medical attention is required.
 - Considering risk factors should be excluded for outdoor, contact sports.
 - Only health related fitness activities should be suggested.

3.4.3

Assessment Module:

त्रिविध बल परीक्षण			
नांव			
वय/लिंग			
जन्म तारीख		परीक्षण दिनांक	
जन्म स्थान			
9. सहज बल परीक्षण			
9.9 प्रकृति परीक्षण			
परीक्ष्य भाव	वात	पित्त	कफ
सर्वांग	कृश दीर्घाकृती	सुकूमर अवदातगात्र, मध्यम	सारसंहत, उपचित
त्वचा	रुक्ष कृष्ण, परुष स्फटित	उष्ण, आरक्त, शिथिल	गौर, स्निग्ध, श्लक्ष्ण, मृदु
वर्ण	कृष्ण, श्याम	श्यामावदात, गौर, आरक्त	गौर
नेत्र	धूसर, खर	कपिल, पिडगल, तनुअल्पपक्ष्म	रक्तान्त, सुस्निग्ध
	वृत्त, अचारु	हिमप्रिय, आरक्त,	सुव्यक्तपक्ष्मलाक्षः
		सुप्तेकर्णिकारान	शुक्लासितः विशालदीर्घ
केश	रुक्ष, परुष	पिडगकेशोडल्परोमा	घननीलकेशा
	स्फुटित, धूसर		
संधी	चल अनवस्थित	शिथिलमृदुसंधिबंध	गूढ समसुविभक्त
	सततसन्धिगामिनः		सुश्लिष्टसारसंधिबंधन :
गती	लघुचपल, अनवस्थित	तीक्ष्ण चपल	साराधिष्ठित

			अवस्थित मन्दगतयः
असहत्व	शीतासहत्व	उष्ण,क्लेश	सहत्व
मानस	शीघ्रसमारम्भ	शुरो मानी तीक्ष्णपराकमः	अशीघ्रकोध संताप
	क्षोभरागविरागः		
गुण			
प्रकृति विनिश्चय			
गुणांकन			
9.2 सारता परीक्षण			
धातु	सारत्व	स्थान	गुण/असारत्व
रस	सुकुमार मृदु	गण्ड, हस्त, पाद	
	अल्प रोम, स्निग्धत्व		
रक्त	आरक्तता,	कर्ण, नेत्र, ओष्ठ, जिह्वा,	
	उष्ण क्लेशासहत्व	पणिपादतल, नख	
मांस	स्थिर मांसोपाचित	अंस, कर्पूर, जानू	
	गूढसंधि		
मेद	विशेषतः स्निग्ध	उदर, स्फिक, हस्त पाद	
	अल्पबल, अक्लेशासहत्व		
अस्थि	संधीस्थूल	पर्वसंधि, हस्त पाद संधि	
	महोत्साहाः		
मज्जा	स्थूल, वृत्त, गुढ संधी	जानु,गुल्फ, कुर्पूर	

	महाबल		
सत्व			
२ कालज बल			
	२.१ सद्य स्वास्थ्य	लक्षणे	गुण
	नाडी: / मि		
	मुत्र		
	मल		
	उदर		
	वेदना		
एकुण गुण			
२.२ गर्भकालीन स्वास्थ्य			
गर्भकालीन	ळो	नाही	
विकृति	मतृज/गर्भ		
प्रसवकालीन	ळो	नाही	
विकृति			
जन्मकाल			
जातज	रचनात्मक		
	सहज व्याधी		
एकुण गुण			
२.३ कुलज वृत्त			गुण
माता पिता स्वास्थ्य	चांगले / वाईट		
खेळ आवड	होय	नाही	
प्रवृत्ती	होय	नाही	
आहार सवयी			
आजार	ळो	नाही	

२.४ पुर्वव्याधी वृत्त			
वारंवार आजार	होणारे नाही	कृमी, प्रतिश्याय, श्वास	हृद्रोग अपस्मार
वारंवारता	नाही	ऋतुसंधी ४.५ times	सातत्य
Recovery		3-4 day	
रचनात्मक			
३ युक्तिकृत बल			
३.१ आहार			
	रसप्रीती		
	रससात्म्य		
	आहार सवयी		
	अभ्यवहरण		
	आहार तकारी		
५			
३.२ विहार			
	खेळण्याची प्रवृत्ती		
	खेळण्याची सवय		
	किती वेळ		
	चेष्टा सहत्व	क्लेशसहत्व, आतपसहत्व	
	खेळप्रकार आवड		५
४ व्यायामशक्ती परीक्षण			

४.१ व्यायाम प्रतिक्रिया			
		श्वास	
		शूल	
		वंप	
		तृष्णा	
		स्वेद	
		ग्लानी	
		भ्रम	
	Recovery	१० मिनिटानंतर	
		लक्षणोपशय	

To understand the practical applicability of this module survey study was conducted by researcher. In this study 100 participants were assessed for Trividha Bala. These participants included players from sports school and football academy. Present study showed that module of assessment of Trividha Bala is practically applicable in the sports field. It gives vivid idea of strength and tolerance ability of a person which is referred as fitness in the field of sports. It also gives prognostic view of one's strength, probable injuries, adaptability or ability to cope up with physical exertion. Detailed results of this study are explained in next chapter of this study.

3.5 Balopāsānā Module Based on Āyurveda Principals

Introduction:

We have explored the concept of trividha Bala in Āyurveda and its relevance with sports related fitness. Trividha Bala includes Sahaja bala (innate strength) Kālaja Bala (seasonal variant of strength) and Yuktikṛta Bala which is the modifiable type of strength. Yuktikṛta Bala is defined as the physical power acquired by proper management of diet, exercise, rest and rasayan therapy along with it. We have studied the meaning of Yukti, i.e. strategic planning of lifestyle factors for acquisition of physical power. Concept of Abhyāsa referes to consistent practice of factors of Yuktikṛta Bala for conservation of sahaja bala.

Yukti and Abhyāsa i.e. strategically planned consistent application of lifestyle factors to acquire and conserve and enhance physical power comprises to the concept of Balopāsanā i.e. (worship of physical power) in present world of sports. In earlier part of this study we have studied the philosophy of Balopāsanā in Sanskrit Literature since Vaidika period. Need of holistic fitness concepts in present sports and fitness field is explained. Researcher feels that this need can be fulfilled with ancient Indian Philosophy of Balopāsanā.

In this section we will explain the practical considerations of concept of Balopāsanā from Sanskrit literature on Āyurveda and Yoga. We will explain the measures of conservation and enhancement of Bala (Power) from Āyurveda and Yoga. Togetherly these principles will address the holistic fitness comprised of physical, mental, intellectual and spiritual facets.

3.5.2: Factors Involved in Balopāsanā:

Balopāsanā involves strategic planning and applications of factors of Yuktikṛta Bala in Āyurveda and Yoga to nurture physical, mental, intellectual facets of Power (Bala).

In earlier part we have studied the philosophy of inclusion of factors of Yuktikṛta Bala, Now we will understand the practical applications of factors of Yuktikṛta Bala Āyurveda.

युक्तिकृतं पुनस्तद्यदाहारचेष्टायोगजम् ।

च सू ११/३६

आहारस्य मांससर्पिरादेः, चेष्टाया उचितविश्रामव्यायामादेर्योगः आहारचेष्टा योग अन्ये तु योगशब्देन रसायनप्रयोग गाहयन्ति ॥

चक्रपाणि टीका

Factors of Balopāsanā Comprises of-

- 1) Āhāraa- Nutrition
- 2) Vyāyāma- Exercise
- 3) Vihāra- proper rest and lifestyle measures.
- 4) Yoga- Rasāyana and Yoga therapy for mental faculties.

Now we will explain the principles behind practical application of each factor with the context of sports persons.

1) Āhāra (Nutrition):

Food is the basic constituent of human body,

प्राणिनां पुनर्मूलमाहारो बलवर्णोजसां च ।

सु सू १/२८

स षट्सु रसेष्वायत्तः रसाः पुनद्रव्याश्रयाः ॥

Food is the base of human body, power, ojus etc. Food is considered as instant power booster. Metabolism of body constituents is dependant on food and proper digestion of food by digestive fire.

यदन्नं देहधात्वोजोबलवर्णादिपोषकम् ।

तत्राग्निहेतुराहारान्न ह्यपक्वाद्रसादयः ।

च चि. १५/५

After proper digestion of food Āhāraras is developed which is further transformed into all body constituents.

रसाद्रक्तं ततो मज्जवैसं मांसान्मेदस्ततोऽस्थि च ।

अस्थ्नो मज्जा ततः शुक्र शुक्राण्डर्भः प्रसादजः ॥

च चि १५/१६

Food and its metabolism are base of entire body constitution and power. It should be applied very cautiously considering all related factors. In sports power is the prime important factor for performance and it is based food, hence Nutrition plays a key role for athlete in Balopāsanā.

For the best possible outcomes of food, principles of nutrition and dietetics (Āhāra-vidhi) are explained in Āyurveda. It is called as Āhāra Vidhi visheshayatatan (principles of diet)

तत्र खल्विमान्यष्टावाहारविधिविशेषायतनानि भवन्ति । तद्यथा प्रकृतिकरणसंयोगराशि देशकालोपसंस्थोपयोक्ताष्टमानि ।

च.वि.१/२१

Āhāraavidhi viśeṣāyatana are the specific factors which deal with positive and negative effects of food. These eight factors are as follows:

- 1) Prakṛti (Natural quality)
 - 2) Karaṇa (Preparation of food)
 - 3) Saṁyoga (combination)
 - 4) Rāśi (Quantity)
 - 5) Deśa (habitat)
 - 6) Kāla (Seasonal effect)
 - 7) Upayogasamshtā (Rules of use)
 - 8) Upyoktā (The user)
- 1) Prakṛti : (Natural quality of food)

तत्र प्रकृतिरुच्यते स्वभावो यः ।

Depending on whether the food is easily digestible or not, it is classified in heavy and light qualities. Meat is heavy for digestion and rice is lighter. This is basic nature of food which should be taken into consideration while application.

Some foods are naturally having balya (Power booster) property. Those foods should be consumed by athletes.

वृष्यादीनां प्रभावस्तु पुष्पाति बलमाशु हि ।

वृष्यादीनां क्षीरादिद्रव्याणां प्रभावो बलं शीघ्रं पुष्पाति ।

Milk is instant energy booster by its effect. In Yuktikṛta bala application of meat, ghee, is specially mentioned in context of Bala enhancement. Thus, naturally gūru, unctuous, food should be consumed by athletes to enhance bala. Examples of naturally power booster foods are –

- Godhuma - wheat सु.सू.४६/४३

- Meat - chicken सु.सू.४६/५३ १०२
- Eggs - बल्य, वृष्यं सु.सू.४६
- Milk - बल्य मांसोपचयकरं श्रमहरं सु.सू.४५/४९
- māṣa - White gram सु.सू.४६/३४
- Curd - बलवर्धन सु.सू.४५/६८
- Kilat - paneer सु.सू.४५/९१
- Butter, ghee - बलकरं वृष्यं सु.सू.४५/९२
- Oil - स्थैर्य, बलकरणं सु.सू.४५/९४
- Meat - chicken, lamb etc and seafood are instant power boosters.

सु.सू.४६/५३ १०२

These foods should be regularly consumed by athletes.

2) **Karaṇa - (preparations)**

करणं पुनः स्वाभाविकानां द्रव्याणामाभिसंस्कारः ।

संस्कारो हि गुणान्तराधानमुच्यते ।

च.वि. १/२१/२

Karaṇam includes preparation involved in cooking food. Generally cooked food is easy for digestion. Processing includes methods like roasting, frying, baking, heating, mixing with water, boiling, drying, churning etc. Depending on the method of processing the qualities of the food may change. Hence it should be taken into consideration.

Soups, liquid meals are quickly assimilated and results in properties like balya, enhancing bala quickly than roasted or barbequed food. Hence while applying food after exercising it should be in liquid form like maṇḍ, maṇṭh, (liquid cereals) yuṣa, vesavār (veg non-veg soups), faṇṭ (syrups) milkshake etc.

3) **Samyoga - (combination)**

पुनर्द्वयोर्बहुना वा द्रव्याणां संहतीभावः स विशेषमारभते, यः पुनर्नैकैकशो द्रव्याणामारभन्ते ॥ ३ ॥

च.वि.१/२१

While preparing food ingredients are mixed together. These combinations have specific effects like synergistic or opposite. Synergistic effects enhance the quality of combination than separate and whereas opposites reduce the effects of separate foods.

Some combinations are naturally good but some are poisonous sometimes. It should be taken into consideration.

4) **Rāśi:(Quantity)**

राशिस्तु सर्वग्रहपरिग्रहो मात्रामात्र फलविनिश्चयार्थः ।

While eating one has to consider the individual ingredient quantity and the total quantity of the food that is consumed. The quantity of food directly affects the digestive fire and process of digestion. Hence it should be taken into consideration.

Hence it is directed to consume food in proper quantity as it directly affects power (Bala).

5) **Deśa (Habitat)**

देशः पुनः स्थानं, स द्रव्याण्यामुत्पत्ति प्रचारौ देशसात्म्यं चाचष्टे ।

च.वि.१/२१/५

Deśa is habitat of cultivation and consumption of food. Depending on habitat there is conduciveness of specific foods. Hence that should be taken into consideration. Habituation of foods from other habitat needs to be developed which is important for athletes while travelling.

6) **Kāla (Time) – कालो हि नित्यगश्चावस्थिकश्च**

Time is the factor affecting on food. It is of two types nityag kāla is time of day or seasonal variations which affect the condition of digestive fire. Avasthika Kāla is related to disease which temporarily affect the digestive fire. It should be taken into consideration. While planning diet of athlete

7) Upayogasaṅsthā- (Rules of eating)

8) Upayoktā - (The user)

उपयोक्ता पुनर्यस्तमाहारमुपयुक्ते यदायत्तमोकसात्म्य ॥

च.वि.१/८

The user is one who consumes food. His constitution digestive capacity, appetite, tolerance, habituation, state of earlier food should be taken into consideration habituation should be taken into consideration specially.

Upayogsansta- Rules of Eating

Table 9 Rules of eating and their justification

Rule	Justification
उष्णमश्नीयात्	Consumption of warm food: It tastes well and doesn't pacify digestive fire. Easily gets digested Reduces vāta and Kapha.
स्निग्धमश्नीयात्	(diet should include optimum fat) Unctuous food should be consumed it improves taste of food, increases digestive fire and gets easily digested and assimilated. It pacifies vāta. It gives satiety. It improves strength, hastens body growth, improves sensory function and gives complexion. Dry food reduces strength, increases dryness and creates constipation.
मात्रावदश्नीयात्	Diet should be taken into proper quantity in terms of total quantity and individual ingredients too. Quantity of solid food should be kept 2 parts of stomach liquid food should be 1 part of stomach and 1 part should be kept free. If quantity of food exceeds it reduces digestive ability and vitiates doṣa. Proper amount of food gives rise to comfort, proper

	digestion, improves metabolism and strength.
जीर्णशनीयात्	Meal should be taken after digestion of previous meal. Proper interval should be maintained between two meals. Clear burping, should be considered as sign of digestion of earlier food. Interval eating enhances strength
वीर्याविरुद्धमशनीयात्	consumption of vīrya virudha food causes many diseases. This rule can be excluded for athletes.
इष्टदेशे इष्टसर्वोपकरण चाशनीयात्	Meals should be taken at proper clean place with proper instruments. It gives pleasure of having food. Proper hygiene, proper utensils and presentation of food .
नतिद्रुतमशनीयात् नातिविलम्बितशनीयात्	One should not eat very fast or very slow. Eating very fast may lead to various problems like food entering into respiratory track, choking etc. very slow eating affects rate of digestion hence food should be taken with proper speed. One should not talk or laugh much while eating.
तन्मना भुञ्जीत्	If food is not taken with proper mental condition it may affect digestion. Mental factors like worry, fear, anger, sorrow leads to digestive problems and sleep disturbances. Hence food should be taken in proper mental condition.

Significance of Āhāra vidhi in Balopāsanā with the context of sports person:

As mentioned in Āyurveda food is the base of life, power. Strength or power is the most important factor of sports related fitness and plays a key role in performance and success. Hence, proper application of food is very important. Āhāra vidhi described by Acārya Caraka is a comprehensive guide for nutrition and dietetics. It includes all aspects that should be specially considered in case of sports persons.

e.g. quantity, deśa, Kāla, consideration of effect of mental factors on food is the uniqueness of this Āhāraa vidhi.

मात्रया ऽप्यभ्यवहृतं पथ्यं चान्नं न जीर्यति ।

चिन्ताशोकभयक्रोध दुःखशय्याप्रजागरै ॥

च.वि. २/९

it means someone who consumes proper food in proper quantity, but he is affected anxiety, mentally with sorrow, grief, anger and keeping awake late night cannot metabolize food properly. It should be takes into consideration.

Another special consideration for sports person in context of food mentioned in Āyurveda is they are one who can tolerate heavy foods and they are not affected by Virudha Āhāra (incompatible food) directions given by Āyurveda.

सात्म्यतोऽल्पतया वाऽपि दीप्ताग्ने तरुणस्य च ।

स्निग्धव्यायामबलिनां विरुद्धं वितथं भवेत् ।

च.सू. २६/१०८

अ.सं.सू ९/२३

सु.सू. २०/२२

Those who follow regular exercise are not affected by virudha Āhāra (incompatible food). Whereas virudha Āhāra concept can be used positively for athletes for to compensate acute wear and tear effects of exercise. Fruit milk shakes can be given immediately after strenuous training session in hot and dry climate to compensate the excessively increased vāta pitta doṣa and reduced Kapha doṣa condition.

Practical Application of Āhāraavidhi for athletes:

Based on Āhāraa vidhi and according to training schedule daily nutrition plan can be prepared taking time, travelling, habitat, season into consideration. Researcher being Āyurveda physician experienced while working with sports persons that these guidelines given in Āhāra vidhi are practicals helpful in individualization of nutrition for athletes.

Few representative case studies reports are discussed in next chapter of this study.

2) **Svasthanvṛtta and Balopāsana:**

Yuktikṛta Bala involves strategic planning of food and proper management of exercise and rest. (उचितविश्रामव्यायामादेर्योगः). This term is explored as Svasthanvṛtta in Āyurveda which includes healthy lifestyle measures for maintenance and improvement of health for long life. It includes Dinacaryā (daily routine) Ṛtucaryā where exercise is the part of Dinacaryā.

When someone chooses sports as a career activity then it exerts excessive stress on vital organs causing excessive wear and tear of body. Hence, for conservation of innate strength and longlife they need supportive care timely compensation of exercise induced wear and tear of body constituents. Hence, along with exercise Svasthanvṛtta measures stands for managing exercise and rest proportionately.

Here we will discuss svasthanvṛtta measures with special respect to exercise and considering sports persons. It includes

- A) Proper exercise
- B) Post exercise measures including Abhyaṅga, Pādābhyaṅga, Udvartana, snāna, śek, Nasya, Āhāra.
- C) Rest - Nidrā, Divāsvāpa, Brahmacharya.
- D) Ṛtucaryā and Vyāyāma consideration.
- E) Yoga - Rasāyana therapy
Yogic practices.

A) Exercise:

Health benefits of Vyāyāma have been discussed earlier, now researcher will explore practical considerations of Vyāyāma mentioned in Āyurveda with special context of sports training. According to Āyurveda, exercise is advocated in proper limit and its limitations are explained. It is included under habituation factors (Sātmyaja bhāva) which means exercise will

be harmless with regular progressive practice. Exercise is discussed under factors which should be avoided in excess.

व्यायामहास्यभाष्याध्वग्राम्यधर्मप्रजागरान ।

नेचितानपि सेवेत बुद्धिमानतिमात्रया ॥

च.सू.७/३४

सात्म्यनि तु देशकालजात्युर्तुरोगव्यायामोदकदिवास्वप्नरसप्रभृतीनि प्रकृतिविरुद्धान्यपि यान्यबाधकराणि भवन्ति ।

Proper Limit of Exercise:

शरीरचेष्टा या चेष्टा स्थैर्यार्था बलवर्धिनी ।

देहव्यायामसंख्याता मात्रया तां समाचरेत् ॥

च.सू.७/३३

These aphorisms denote that Vyāyāma (exercise) is consumed within limitation. Limitation is also precisely described in Āyurveda follows,

बलस्यार्धेन कर्तव्यो व्यायामो हन्यतोऽन्यथा ।

हृदि स्थानस्थितो वायुर्यदा वक्त्रं प्रपद्यते ॥

व्यायामं कुर्वतो जन्तोस्तब्दलार्धस्य लक्षणम् ।

वयोबलशरीराणि देशकालाशनानि च ।

समीक्ष्य कुर्यात् व्यायाममन्यथा रोगमाप्नुयात् ॥

सु.चि.२४/४६.४८

स्वेदागमःशवासवृद्धिः गात्राणां लाघवस्तथा ।

हृदयाद्युपरोधश्च इति व्यायामलक्षणं ॥

च.सू.७/३३.१

योगीन्द्रनाथसेन संमतपाठ

In these versus quantity of Vyāyāma (exercise) that should be daily consumed is specified. In Suśruta saṁhitā the optimum quantity is of Vyāyāma (exercise) is defined as half of one's maximum capacity (Arvdhaśakti)

Indications of reaching half capacity mark are described in Suśruta saṁhitā as follows.

1) when one starts breathing through mouth:

This is signified the discrepancy in the demand and supply of oxygen via breathing due to increased demand of oxygen by exercise. Thus, normally inhaled air is inadequate to meet the increased demand body compensates by mouth breathing. It is explained as per exercise physiology.

In śāraṅgadhara saṁhitā the process of breathing (śvasana) is

it is explained as

नाभिस्थः प्राणपवनः स्पृष्ट्वा हृत्कमलान्तरम् ।

कण्ठाब्दहिर्विनिर्याति पातुं विष्णुपदामृतं ।

पीत्वा चाम्बरपीयूषं पुनरायति वेगतः ।

प्रीणयन्देहमस्त्रिला जीवयन्जठरानलम् ॥

शा.स.प्र.ख.५/४८.४९

According to śāraṅgadhara saṁhitā the prana beginning its upward journey from umbilicus and touches the interior of the heart to proceed to the lungs. Where after interacting with the inhaled prana it returns to the body again touching the interior of the heart to nourish and sustain life processes.

This is the intended meaning of the verse where they mention of the need to breath through mouth. As the prana residing in the heart is compensated and experienced in mouth breathing (श्वासवृद्धी, हृदयद्युपरोधश्च) mentioned in Yogindranath comment of Caraka saṁhitā is explained by the same process.

Appearance of Sweat: Appearance of Sweat in palms and soles of feet signifies to effect of exercise on fluid and unctuous content in the internal environment. When the effect of exercise

reaches the circulating Rasa and Rakta, palms and soles exhibit sweating the represent state of Rasa, Rakta in the body.

Appearance of sweat in armpits, this area is the joint between chest and upper extremity it is characterized by presence of broad, thick dense muscles. Hence appearance of sweat after exercise in this region indicates effects of on the Māṅsa dhātu. Normally people who tend to sweat on minimal exercise have a deficient Māṅsa metabolism.

Appearance of sweat at the tip of nose signifies effect of exercise on Rakta and meda dhātu. Since nose is cartilaginous structure (Tarūṅsthī). In same way, appearance of sweat on forehead is signified the exercise effect of Ashtī, Rakta, meda dhātu. Metabolism.

Appearance of sweat at big joints indicates effects of exercise on majjā dhātu as it is the root of majjā dhātu.

Thus, it is the logical explanation the limitations of exercise with half capacity limit with above indicators. It is based on Sāratā of the person which is the direct measure of Bala (power). Hence this limit depends on individual.

This logical explanation behind indicators of exercise effects is given by Vd. Vilas Nanal in the book “Joint afflictions and their Āyurvedīya perspective”.

Along with half capacity limit Suśrutācārya has directed that exercise should be conducted considering the effect of age, habitat, season and food. It means these factors also affect exercise capacity.

Table 10: Factors affecting assessment of Bala

Factor	Effects
Age	In childhood Bala is less and special attention should be given for conservation of bala, as this is the period of growth. Strength is less during old age. Hence special care should be taken while exercising.
Habitat season	Season and habital also have impact on exercise capacity e.g. dry hot climate in Grīśma Rtu and jāṅgal deśa reduces exercise capacity unlikely compared to cold climate and sādharma deśa. Monsoon season and ānup deśa reduce exercises capacity.

Food	Timing of food ingestion matters while planning exercise time. Exercise is contraindicated immediately after having food and vāta doṣa is increased when food is digested. Both conditions are not suitable for exercise, hence it has been directed that there should be proper interval maintained between food and exercise.
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Thus, we can see the practical implication of exercise explained in Āyurveda.

Contraindication of Excessive Exercise:

As mentioned exercise is one of the factor which should not be performed or consumed in excess amount. If it is consumed in excess or in a wrong way, it might prove life threatening .

एतानेवंविधांश्चान्यान् योऽतिमात्रं निषेवते ।

गजं सिंह इवाकर्षण सहसा स विनश्यति ॥

च.चि. ७/३५

if someone does exercise in excess quantity or performs exercise of type which is not suitable for his body, it increases vāta doṣa leading to harmful effects on the body. For explaining this example of lion killing mighty elephant is given. In this example type of exercise and load of exercise both are considered further it is mentioned that excessive may lead to disease Rājāyākṣmā and other symptoms.

अयथाबलमारम्भं वेगसन्धारणं क्षयम् ।

यक्ष्मणः कारणं विद्यात् चतुर्थं विषमाशनम् ॥

च.चि.८/१३

Here the term “Ayathābalaṃārāmbha” refers to excessive exercise load in terms of quantity, frequency and duration.

इह खलु चत्वारि शोषस्यायतनानि भवन्ति, तद्यथा साहसं संधारण क्षयो विषमाशनमिति । तत्र साहसं शोषस्यायतनमिति यदुक्ता तदनुव्याख्यास्यामः यदा पुरुषो दुर्बलो हि सन् बलवता सह विगृह्णाति, अतिमहता वा धनुषा व्यायच्छति, जल्पति वाऽप्यतिमात्रम् अतिमात्रं वा भारमुद्धहति, अप्सु वा प्लवते चातिदुरम् उत्सादनपदाघातने वा ऽतिप्रगाढमासेवते, अतिप्रकृष्टं वा ऽध्वानं द्रुतमभिपतति, अभिहन्यते वा, अन्यद्वा किंचिदेवंविधं विषमातिमात्रं वा व्यायामजातमारभते तस्यातिमात्रेण कर्मणोरः क्षयते ।

च.नि. ६/४

माधवनिदान ५

तस्मात् पुरुषा मतिमान् बलमात्मनः समीक्ष्य तदनुरुपाणि कर्माण्यारभेत कर्तुः बलसमाधानं हि शरीरं, शरीरमूलश्च पुरुष इति ।

च.नि.६/४

Rājanyakṣmā is considered as the king of diseases in Āyurveda. Excessive Vyāyāma is considered one of the leading cause for it. It falls under the category of Sāhasa (Adventure). While explaining types of adventures there are some examples given as follows:

- 1) fighting with mightier opponent.
- 2) Using very strong bow (using improper exercise instrument)
- 3) lifting excessive weight suddenly
- 4) Swimming too deep and too far
- 5) Excessive and very fast riding
- 6) Suddenly wrong or excessive practice of exercise.

Hence it has be suggested that one should assess (adventure) slowly since power holds physical body and physical body is the cause of existence. In this way Āyurveda discusses principle of overloading of exercise, which resembles with exercise physiology. In Exercise physiology this is mentioned as training overload which may lead to overtraining in athletes. It is one of the cause of decrements in performance, injuries or life-threatening complications like sudden cardiac arrest. Hence, training periodization and progressive overloading of training are the concepts applied in exercise physiology while planning training of athletes.

Vyāyāma Samaya (Habituation of Exercise):

Exercise is considered as one of the factor for which habituation can be developed regular and progressive practice.

The guidelines of progressive practice are described in Āyurveda as follows.

उचितादहिताद्धीमान् क्रमशो विरमेन्नरः ।

हितं क्रमेण सेवेत क्रमश्चात्रोपदिश्यते ॥

प्रक्षेपापचये ताभ्यां क्रमः पादाशिको भवेत् ।

एकान्तरं ततश्चोर्ध्वं ह्यन्तरं त्रयन्तरं तथा ॥

च. सू.७/३६.३७

तच्च हितसेवनमहितपरिवर्जनं चाक्रमेण क्रियमाणमक्रमाचरितं व्यायामादिवत् प्रत्यवायकरं परं भवति, अतस्तत्क्रमममाह उचितादित्यादि ।

उचितात् अभ्यस्तात् । चक्रपाणि

In these verses guidelines of progressive consumption of good things and systemic withdrawal from un-healthy practices are described. It has been directed that though anything good or bad for healthy should not be consumed or left suddenly. One should withdraw from unhealthy practices and at the same time progressively practice good thing like Vyāyāma. The

period is mentioned is 15 days where ¼ regression and progression should be followed maintaining systematic interval.

Practical Relevance with Sports Medicine:

In exercise physiology, concept of periodisation and progressive overloading have been mentioned for effective training methods and avoiding overtraining, risk of injuries etc.

The above-mentioned concepts of half capacity exercise, progressive loading of exercise and contradictions of excessive exercise are directive of almost same principles of exercise physiology.

Thus, we can get the directions of practical implication of sports medicine in aricient Ayurvedika texts.

B) Svasthavṛtta (Restorative Measures of Exercise):

Along with Vyāyāma (exercise) there are healthy measures described in Dinacaryā (daily routine) comprising part of Svasthavṛtta. They specifically mention benefits for strength enhancement and compensation of exercise induced wear and tear. It can be considered as restorative or recovery practices for along with regular exercise.

These practices include

- 1) Abhyaṅga (Massage)
- 2) Pādābhyaṅga (foot massage)
- 3) Udvartana (Application of herbal medicines)
- 4) Snāna śeka (Bath, Shower)
- 5) Avagāha (tub Bath)
- 6) Nasya (Nasal practice)
- 7) Āhāra

Practical applications and relevance of each practice with present sports can be explained as follows:

1) Abhyaṅga (Massage):

Āyurveda emphasizes on the systematic daily routine to maintain ideal lifestyle through Dinacaryā principles comprising Svasthavṛtta. Abhyaṅga is mentioned as part of daily routine (Dinacaryā) for its unique benefits. Abhyaṅga refers to massage with oils, it's procedure and benefits are described in detail in Āyurveda texts-

अभ्यङ्गो मर्दवकरः कफवातनिरोधनः ।

धातुनां पुष्टिजननो मृजावर्ण वर्णबलप्रदः ॥

सु.चि. २४/३०

स्नेहाभ्यङ्गङ्गाद्यथा कुम्भचर्म स्नेहविमर्दनात् ।
भवत्युपाङ्गदक्षश्च दृढः क्लेशसहो यथा ॥
तथा शरीरमभ्यङ्गादृढं सुत्वकं च जायते ।
प्रशान्तमाररुताबाधां क्लेशव्यायामसंसहम् ॥
न चाभिघाताभिहतं गात्रमभ्यङ्गसेविनः ।
विकारं भजतेऽत्यर्थं बलकर्मणि वा क्वचित् ॥
सुस्पर्शोपचिताङ्गश्च बलवान् प्रियदर्शनः ।
भवत्यभ्यङ्ग नित्यत्वान्निरोऽल्पजर एव च ।

च.सू. ५/८५.८९

Abhyaṅga is one of the procedure of Dinacaryā and a type of snehana (moisturizing) in Āyurveda. It includes massage with application of medicated oil to the whole body. Ideally direction of massage is upward and towards heart.

Abhyaṅga improves circulation of Rasa dhātu, reduce vāta doṣa. It makes body stout especially māṃsa dhātu (muscles) and increases individual's capacity to endure exercise. It prevents injuries, improves immunity and physical strength as well. It also improves neuromuscular co-ordination. It makes the body attractive and powerful.

2) Pādābhyāṅga (foot massage):

Foot massage (Pādābhyāṅga) is form of Abhyaṅga for foot. It's special benefits and uses are described as –

खरत्वं स्तब्धता रौक्ष्यं श्रमः सुप्तिश्च पादयोः ।
सद्य एवोपशाम्यन्ति पादाभ्यङ्गनिषेवणात् ।
जायते सौकुमार्यं च बलं स्थैर्यं च पादयोः ।
दृष्टीः प्रसादं लभते मारुतश्चोपशाम्यति ।
न च गृध्रसीवातः पादयोः स्फुटनं न च ।
न सिरास्नायुसंकोचः पादाभ्यङ्गेन पादयोः ॥

च.सू. ५/९०.९२

Pādābhyāṅga is foot massage, a type of massage described in Dinacaryā to be followed every day. It reduces dryness, stiffness of muscles and relieves fatigue immediately. It also increases strength and stability of foot. It improves eyesight with its unique neurogenic connections. It is also useful in neuro muscular problems like sciatica, muscle spasm etc.

Role of Massage in sports:

Massage is known to be one of the oldest accepted method in healing. It has been used by man in his age-old attempt to relieve pain and suffering since ancient ages.

Abhyaṅga is mentioned in Āyurveda texts in Dinacaryā of Svasthavṛtta for maintenance of health and long life. While explaining its benefits it has been mentioned that it relieves fatigue, improves ability to sustain exercise, enhances physical strength and provide prevention from injuries. All these aspects are especially important with the context of sports.

Massage is widely used in the field of sports for recovery and treatment of injuries and performance enhancement too. All these benefits were clearly mentioned in ancient Āyurveda texts.

Abhyaṅga reduces exercise induces rise of vāta doṣa and helps in relieving fatigue and hastens the recovery.

Abhyaṅga is specially of required and useful in nourishment of muscles and nerves, it's role can be explained as follows-

मेदसः स्नेहमादाय सिरास्नायुत्वमाप्नुयात् ।
सिराणां तु मृदुपाकः स्नायुणां तु ततः खरः ॥
भारक्षमा भवेदप्सु नृयुक्ता सुसमाहिता ।
एवमेव शरीरेऽस्मिन् यावन्तःभारसहा नराः ॥
सिरास्नायवस्थि पर्वाणि सन्ध्यश्च शरीरीणाम् ।
पेशीभिः संवृतान्यत्र बलवन्ति भवन्त्यतः ॥

सु.शा. ५/३८

स्नेहाभ्यक्ते यथा ह्यक्षे चक्र साधु प्रवर्तते।
सन्ध्य साधु वर्तन्ते संश्लिष्ट श्लेष्मणा तथा ।

सु.शा. ४/१५

चतुर्थी श्लेष्मधरा सर्वसन्धिषु प्राणभृतां भवन्ति।

सु.शा.४/१२.१४

मांस वहानां स्तोतसां स्नायुर्मूलं त्वक् च ।
अस्थिवहानां स्नोतसा मेढे मूलं जघनं च ।
मज्जवहानां स्तोतसामस्थिनीमूलं सन्ध्यश्च ।

च.वि. ५/

muscles are formed from mānsa, meda dhātu metabolism which are responsible for maintenance and smooth movement of joints and weight bearing activities. A person with well-

developed well-defined musculature becomes able to hold maximum strength and bring about efficient kinetic activities. Optimum amount of kapha doṣa and majjā dhātu play important role in lubrication of joints and helps in smooth frictionless functioning of all joints. Proper oiling allows movement of joints. Proper oiling keeps the leather in good quality for longer time, in the same way Abhyaṅga serves to reduce excessive increased vāta doṣa by exercise and also compensates acute reduction in kapha doṣa, majja dhātu as a result of exercise. Abhyaṅga improves circulation of Rasa, rakta dhātu and enhances nourishment and metabolism of all dhātus. In this way Abhyaṅga plays important role in reducing fatigue and enhancing ability to endure exercise.

Muscles, tendons are structurally porous in nature and while formation they undergo excessive vāta doṣa effects. Hence, muscles tendons are easily susceptible to dryness, stiffness and tears by increased vāta doṣa. Abhyaṅga reduces excessive vāta doṣa and helps to compensate wear and tear induced by exercise.

Abhyanga improves neuromuscular co-ordination and reduces sensory and motor pain by improving nourishment of skin nerves and reducing vāta doṣa which is the cause of pain.

In this way, Pādābhyāṅga helps in reducing vāta doṣa at lower extremity and improves. Functions of muscles of lower extremity by reducing stiffness, dryness, spasms etc. it also improves neuromuscular co-ordination of lower limb and prevents diseases like sciatica. Hence it is indicated daily for those who walk for a long time/ distance daily. Athletes of long distance track and field events like football exert more stress on lower limbs and indicated for regular Pādābhyāṅga.

Abhyaṅga also promotes sound sleep by allowing physical and mental relaxation by relieving stress. Hence Abhyanga is useful in sports person to relive competitive stress and reducing anxiety too. Presently sports massage is most widely used method of recovery, treatment of injuries competition for to enhance blood circulation, muscle strength, mental relaxation.

All these benefits have been documented in Āyurveda texts ages back.

Kalāri is the most ancient form of Indian martial arts which still exist in southern India. It has been documented that Kalāri existed since Upniśada period. In Kalāri massage is used to enhance strength of a person. There 108 vital points according to Suśruta saṁhitā have been

documented. This can be considered as earliest practical application of Āyurveda as sports medicine.

3) **Udvaartana (Application of herbal powder):**

Udvaartana means applications of medicinal herbs on the body. It is one of the cleansing process suggested in Dinacaryā to be done after vyāyāma and abhyanga. It helps to clean up the sweat and dust after exercise and protects skin from infections. It also reduces excessive vāta doṣa.

व्यायामस्विन्नगात्रस्य पथ्यामुद्वर्तितस्य च ।

व्याधयो नोपसर्पन्ति सिंहं क्षुद्रमृगा इव ॥

सु.चि. २४/४३

उद्वर्तनं वातहर कफमेदोविलापनम् ।

स्थिरीकरणमङ्गाना त्वक्प्रसादकरं परम् ।

सु.चि.२४/५१

उद्वर्तितस्य पादाभ्यां बहुकृतमर्दनस्येत्यर्थः ।

Udvaartana also involves massage with foot, it helps in reducing vāta doṣa and excessive fat deposition and give stability to the body. Earlier in (Agni purāṇa) application of ash is indicated for cleansing of sweat. Herbs like Caṇḍan uśīr, mustā, anantā, rithā can be used for preparation of herbal soap.

4) **Snāna, Śeka, Avagāha: (Bath/Shower)**

Snāna means bath. It is a cleansing process prescribed after Vyāyāma. It's special benefits after exercise are described as follows-

दौर्गन्ध्यं गौरवं तन्द्रा कण्डु मलमरोचकम् ।

स्वेदबीभत्सता हन्ति शरीरपरिमार्जनम् ।

पवित्रं वृष्यमायुष्यं श्रमस्वेदमलापहम् ।

शरीरबलसन्धानं स्नानमोजस्करं परम् ।

च.सू. ५ /९३.९४

निद्रादाहश्रमहरं स्वेदकण्डुतृषापहम्।

हृद्यं मलहरं सर्वेन्द्रियविबोधनम्।

तन्द्रापाप्मोपशमनं तुष्टिदं पुष्टिवर्धनम् ।

रक्तप्रसादनं चापि स्नानमग्नेश्च दीपनम् ॥

सु.चि. ५७.५८

in Āyurveda texts physical and mental benefits of bath are explained. It removes, sweat, dust, body odour, cleanses body and refreshes mind. It relieves fatigue and gives physical strength too. Bath is considered as instant refreshing measure and it stimulates digestive fire also. In Āyurveda texts temperature of water is suggested to be lukewarm and according to season. After exercise warm cold water bath is indicated as per season but very hot water is contraindicated for head bath in all the seasons. Various forms of bath are indicated according to conditions. Shower (śeka) and tub bath (Avagāha) are the two types described.

सेकः श्रमघ्नोनिलहृद्भदग््नसंधिप्रसाधकः ।
क्षताग्निदग्धाभिहतविघृष्टानां रुजापहः ॥

सु.चि. २४/३१

सिरामुञ्चै रोमकुपैर्धमनीभिश्च तर्पयन् ।
शरीरबलमाधत्ते युक्तः स्नेहावगाहने ॥

सु.चि.२४/३३

Pariśeka is shower bath it relieves fatigue, reduces fatigue. Tailadhārā (continuous poring of oil) is useful in injuries like abrasions, fractures, burns in acute conditions to relieve pain. Whole body shower is useful for injury treatment and nourishment of body constituents too. Avagāha (tub bath or pool bath) is useful in conservation of physical strength and helps to open skin pores, improves blood circulation and refreshes mind. According to Prakṛti habituation, habitat, oil, ghee can be uses for Abhyaṅga, śeka, avagāha along with water. Thus, as a routine cleansing practice, different types and benefits of bath are described in Āyurveda. It is clear from these explanations that snāna, śeka, avagāha (types of bath) are useful in treatment of sports injuries like muscle tear, fractures, along with post exercise recovery to compensate fatigue and vitiated doṣa and mental relaxation too.

5) **Anulepana:**

Application of scented, refreshing extract is suggested after bath is called anulepana.

सौभाग्यदं वर्णकरं प्रीत्योजोबलवर्धनम् ।
स्वेददौर्गन्ध्य वैवर्ण्यश्रमघ्नमनुलेपनम् ॥

सु.चि. २४/६४

It is useful in reducing fatigue body odour, enhancing skin complexion of skin and it increases strength.

This post exercise practices not only serves the cleansing purpose but also useful in recovery and treatment of injuries.

In present sport field shower with hot and cold-water pool bath is widely used as recovery modality after training and competition. Psychological effects of all these practices explained in Āyurveda are unique in nature.

After bath food is indicated which should be unctuous, fresh, heavy and hot. Food should be taken considering Āhāravidhi as explained in Āyurveda.

6) Nasya (instillation of nasal drops):

Nasya is the form of application of medicines via nose. Out of the all sense organs nose is termed as the gateway of head. Regular practice of Nasya helps to keeps the nose, ears, eyes clean, intact and healthy. With the help of Nasya voice becomes clear and unobstructed, it helps to prevent premature graying of hair, baldness and stiffness of neck and jaw.

A type of nasya called pratimarṣa nasya is specially indicated for those who regularly follow exercise. Its benefits are directed towards compensation of acute vitiation of doṣa, nourishment of dhātu and reduction of fatigue. Pratimarṣa nasya is indicated for 14 times of the day. It is desirable for everyone and all the time throughout the year.

आजन्ममरणं शस्तः प्रतिमर्शस्तु बस्तिवत् ।

अ. ह. सू. २०/३२

It is application of 2 drops of oil drops or little oil into nose. It does not require any instrument for application. Different times of application of Pratimarṣa nasya are directed as follows:

निशाहर्भुक्तवान्ताहःस्वप्नाध्वश्रमरेतसाम् ।

शिरोभ्यत्रजनगण्डूषप्रस्त्रावान्जन वर्चसाम् ॥

दन्तकाष्ठस्य हास्यस्य योज्योऽन्तेऽसौ द्विबिन्दुकः ।

वा. सू. २०.२८

व्यायाममैथुनाध्वपरिश्रान्तसेवितः श्रममुपहन्ति ।

सु. चि. ४०/५२

अध्वव्यायामव्यवायान्ते श्रमक्लमस्वेदस्तम्भनाशः ।

अ.सं. सू २९

Pratimarṣa nasya is specially indicated after long walk, exercise and intercourse. It helps to reduce fatigue, stiffness and sweating.

Another time of Pratimarṣa nasya is after sleeping in daytime (divāsvāpa) since sports persons are excluded from contra indication of divāsvāpa, pratimarṣa nasya is indicated to reduce doṣa vitiation after waking from afternoon sleep and increasing concentration.

दिवास्वप्नोत्थितेनासेवितो निद्राशेषं गुरुत्वं मलं चापोह्य चित्तैकाग्रं जनयति ।

सु.चि.४०/५२

it is also indicated before sleep for sound sleep and fresh awakening.

सायं चासेवितः सुखनिद्राप्रबोध चेति ।

सु.चि.४०/५२

For pratimarṣa nasya, oil (linseed oil) is desirable all the season.

For athletes this is the unique way of restorative and conservative treatment. Researcher has observed performance enhancing effects of this treatment on athletes via case studies like shortness of breath in end hours of track athletes and proved helpful in kabaddi and Kho-Kho players as well.

7) **Viśrāma: Proper Rest – (उचितविश्राम):**

Yuktikṛta Bala comprises of combination of exercise and proper rest and restorative treatment measures. These measures include Dinacaryā of Svasthavṛtta , which can be termed as part of active recovery. Sleep is termed as passive recovery measure in exercise physiology. According to Ayurveda it falls under Ratricaryā which also includes abstienence.

1) **Nidrā:**

Sleep is natural restorative measure of health. Its considerations with exercise can be explained as follows-

यदा तु मनसि क्लान्ते कर्मात्मानः क्लमान्विताः ।

विषयेभ्यो निवर्तन्ते तदा स्वपिति मानवः ॥

च. सू. २१/३५

when a person is physically, mentally fatigued and withdraws attention from daily activities he sleeps.

Benefits of sleep are described while explaining the philosophy of Yuktikṛta Bala. Now practical considerations of sleep for sports persons will be explained.

Sleep should not be consumed excess or at wrong time.

अकालेऽतिप्रसङ्गाश्च न च निद्रा निषेविता ।

सुस्त्रायुषी पराकुर्यात् कालरात्रिस्त्रिवापरा ॥

च.सू.२१/३७

- Though sleeping during day time is indicated for sports person to compensate excessive vitiation of vāta and nourishment of Kapha doṣa and body constituents. It should not be consumed in excess and at wrong time e.g. immediately after lunch or during evening time.

Another very important consideration is sleeping during day time cannot be a replacement for night sleep hence sports persons should consume proper night sleep of 8-10 hours.

- Further about sleep it has been indicated that

तस्मान्न जागृयाद्रात्रौ दिवास्वप्नं च वर्जयेत् ।
ज्ञात्वा दोषकरावैतौ बुधः स्वप्नं मितं चरेत् ॥
अरोगः सुमना ह्येवं बलवर्णान्वितो वृषः ।
नातिस्थुलकृशः श्रीमान् नरो जीवेत् समा शतम् ॥
निद्रा सात्मीकृता यैस्तु रात्रौ च यदि वा दिवा ।
दिवारात्रौ च ये नित्यं स्वप्नजागरणोचिताः ॥
न तेषां स्वपतां दोषो जाग्रता वाऽपि जायते ।

सु. शा ४/२९.४१

- Sleep is the Sātmyaja (Habituation) factor. Habituation of sleep can be created by following typical cycle of sleep during night and day time regularly. Then it won't be harmful. It is true in case of divāsvāpa for athletes. Keeping awake late night is never indicated for sports persons since it increases Vāta doṣa and dryness in the body

रात्रौ जागरणं रुक्षं ।

च.सू. २१

It increases susceptibility of muscle injuries in sports persons. If at any time athletes have to keep awake at night, they should consume half time sleep before lunch in next day.

Hence athletes should follow regular pattern of sleep during day time and night time, it helps to enhance strength and longevity.

2) **Abstinence (Brahmacarya):**

Principle behind following abstinence is conservation of health and long-life. It is one of the base of tripod of life.

In case of sports person context of following abstinence lies in conservation of śukra dhātu which is the seat of Oja and strength. It has been indicated that one who follows in moderation can become strong firm, muscular and will live healthy long life.

आयुष्मन्तो मन्दजरा वपुर्वर्णबलान्विताः ।
स्थिरोपचितमांसाश्च भवन्ति स्त्रीषु संयता ॥

सु.चि.२४/११२

Excessive sexual intercourse can lead to various diseases like Rājanyakṣmā etc.

अतिस्त्रीसंप्रयोगाच्च रक्षेदात्मनमात्मवान् ।

अतिव्यवायाजायन्ते रोगाश्चाक्षेपकाद्या ॥

सु.चि. २४।१११

Hence one should not consume excessive intercourse. The frequency of sexual intercourse has been indicated in Āyurveda texts which helps to conserve and improve health and strength as follows.

स्त्रिभिस्त्रिभिरहोभिर्वा समीयात् प्रमदां नरः ।

सर्वेष्वृतुषु, घर्मेषु पक्षात् पक्षाद्दर्जेबुधः ॥

सु.चि.२४/११२

one should follow frequency of intercourse once in a three day during all seasons except summer. During summer season it should be followed once in a fort night.

With maintenance of this interval one can get health benefits of intercourse.

In case of sports persons excessive intercourse and exercise may cause decrements in health, fitness and performance.

D) R̥tucaryā:

All environmental factors like nature of land, water and atmospheric phenomenon including temperature, humidity, wind, rain, clouds etc. keep continuously changing. R̥tucaryā refers to adjusting lifestyle routine with seasonal variations. While explaining the concept of Kālaja Bala we have discussed its effects on physical strength. Here we practical considerations of seasonal variations and lifestyle planning of sports person will be explained.

Environmental changes in temperature affects digestive ability, equilibrium of doṣa hence affects physical strength and exercise capacity. Hence to maintain equilibrium of doṣa and agni (digestive fire) one has to make appropriate changes in lifestyle that is referred in R̥tucaryā. It includes guidelines of Āhāra, vihāra, medicines according to every seasonal condition.

Based on principles of R̥tucaryā, planning of diet and lifestyle of an athletes should be done considering daily exercise. Though Ayurveda advocates to avoid exercise during seasons Grīṣma, Varṣā and śarada, it is not desirable and practically possible. Thus, planning of lifestyle of athletes and other complementary measures can be applied to compensate vitiated doṣa and protection from environmental effects on strength of Athletes.

This can be applied while planning environment acclimatization as players have to travel Lifestyle management while playing in extreme weather conditions like extremely hot or cold. This is useful in lifestyle planning of athletes according to environment.

Ṛtucaryā with the special context of sports:

According to principles of Āyurveda about Svasthavṛtta and Ṛtucaryā, half capacity (Ardhashaktī) exercise is indicated in all the seasons of the year but in Grīśma (Summer) and Varṣā (monsoon) period exercise is contraindicated due to climatic conditions and effects of doṣa constitution. But practically it becomes difficult to follow these guidelines because of competitive schedules and training requirements.

These guidelines are helpful in planning athlete's training schedule diet and preventive treatment regime for athletes. It can be explained as follows. It can be termed as krida Ṛtucaryā.

Table 11: Ṛtucaryā and indications of exercise, training and nutrition

Sr. No.	Ṛtu Season	Exercise indication	Training	Āhāra, Vihāra and Medicines
1	Hemanta śīśira Dec to Feb	Max Capacity exercise indicated -Physical strength is at its best	Full capacity fitness training can be planned as physical strength and natural conditions or favourable	Āhāra- heavy unctuous food be given in hemaṇta and śīśira Ṛtucaryā
2	Vasaṇta Autumn Feb to April	As it is transition period from cold climate to hot climate, digestive ability is weak and doṣa are liquified hence immunity and strength is reducing exercise is indicated in moderation	Exercise is indicated hence moderate to heavy fitness exercise training should be planned. special care of immunity should be taken. Diet should be planned according to digestive ability	Very unctuous food should be avoided -soups, syrups Should be included -seafood should be avoided -Nasya -Basti should be followed
3	Grīśma Summer	Weather is dry and hot strength is less	Considering the hot and dry	Hydration should be taken

	April-June	and Exercise is not indicated	climate training should be planned light intensity Training time should be early morning /evening swimming should be included in training / recovery Indoor fitness sessions	care with rice water fruit juices, syrups during and after exercise -food should be unctous -Ghee, milk should be included - Yogart (Sweet fruit) -cold water with chandan, Kapur -Lotus should be used - Divāsvāpa -Pariśeka snāna -swimming
4	Varṣa Monsoon	Due to cloudy weather digestive fire is weaker and strength is reduced vāta doṣa increased Exercise should be avoided	Training intensity moderate according to time of rain -Warm water tub path, pool bath should be followed -indoor training sessions Gym or Yoga should be conducted	-Proper cleaning practices -Basti -food should include roasted meat, soups -warm water+ honey
5	Sharad (post -	Weather is hot pitta	Training should be	Should be

	monsoon) (sept oct.)	doṣa is increased	conducted morning or evening time. intensity can be moderate to high	followed like Grīṣma
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Practical implication of Ṛtucaryā in sports:

Guidelines given in Ṛtucaryā are directive for developing adaptation with climatic condition and habitat with the concept of habituation and Ṛtucaryā. Acclimatization of sports persons can be planned since travelling across the world is the integral part of any athletes' life.

These guidelines are useful in maintaining and enhancing immunity of athletes towards climatic changes. Thus, it is helpful in enhancing strength and performance of an athlete.

E) Rasāyana and Yoga Therapy:

1) Rasāyana:

Yuktikṛta Bala involves proper management and practice of nutrition, exercise, rest and restorative measures and Rasāyana therapy along with it. Rasāyana therapy required for Yuktikṛta bala falls under category of kāmya Rasāyana, which is oriented towards attaining Bala.

Rasāyana therapy involves medicine and therapies like Anuvāsana Basti, Yāpana Basti, Abhyaṅga, Pratimarṣa nasya etc. Rasāyana therapy gives following benefits:

दीर्घमायुः स्मृति मेधामारोग्यं तरुणं वयः ।

प्रभातवर्णस्वरौदार्यं देहेन्द्रियबलं परम् ।

वाक्सिद्धिं प्रणतिं कान्तिं लभते ना रसायनात् ।

च.चि. १/१/७.८

why sports person need Rasāyana therapy is explained as follows

सर्वे च दोषा भवन्ति..... विषमातिमात्राव्यायामायासङ्गेभि वपुषां ।

क्रोधलोभ भय शोकायासबहुलानां । ह्यविशुद्धः सन्जायते रसः । रक्तं विदह्यते । शिथिलिभवन्ति मांसानि । शुक्रं नौजो न बलं न वीर्यं ।

तस्मात् बुद्धिमानपास्य यथोक्तानाहारदिदोषान निर्वाह्य च पूर्वोपचितान् रसायनं विधिविहितमुपसेवेत् ।

अ.सं. ३. ४९/६

if person follows excessive exercise or wrong type of exercise leads to metabolic problems, excessive heat production, muscles become lax and weaker which results in reduction is physical strength and vigor.

Hence along with exercise one should follow proper nutrition rest and restorative measures and Rasāyana therapy for conservation of physical strength health and longarily

Rasāyan Āhāra:

There are various nutrition combinations described in Āyurveda which directly proves strength enhancing.

e.g.

- 1) घृतभृष्टमत्स्यमांस - Roasted fish with ghee
- 2) वृष्यो पुपलिकायोगो बृंहणौ बलवर्धनौ: Momos
- 3) चटक तिलीर कौक्कुट मण्ड Ghee: Non-veg soups with ghee
- 4) Ghee and black gram + buffalo milk + eggs- Balya

च. चि. २/१/४२.४३

there are various medicinal formations described in Āyurveda for use of Balya Rasāyana

- १ हरीतकी पंचरसामुष्णामलवणां शिवाम् ।
दोषानुलोमनी लघ्वी विद्याद्विपनपाचनीम् ।
आयुष्यां पौष्टिकी धन्यां वयसः स्थापनी पराम् ।
सर्वरोग प्रशमनी बुद्धीन्द्रियबलप्रदाम् ॥

च.चि.१/१/३०

Harītaki (Terminalia chebula) is an herb widely used in Ayurveda. It can be used as Balya Rasāyana in various forms like Cyavanprāśa, Brahma Rasāyana, triphalā curṇa etc. It can be used for massage with oil or ghee.

- 2) Triphalā Rasāyana is mentioned bala enhancing

च.चि.१/३/४७

for instance some of the balya (enhancing physical strength) medicinal herbs mentioned in Āyurveda texts.

बला

बला स्निग्धा हिमा स्वादुर्वृष्या बला त्रिदोषनुत् ।
रक्तपित्त क्षयं हन्ति बलौजो वर्धयत्यपि ॥

भा. प्र.

अश्वगंधा :

अश्वगंधानिलश्लेष्मा शिवत्रशोथक्षयापहा ।
बल्या रसायनी तिक्ता कषायोष्णाऽतिशुक्रला ॥

भा. प्र.

शतावरी :

शतावरी गुरु शीता तिक्ता स्वाद्वी रसायनी ।
मेधाग्निपुष्टिदा स्निग्धा नेत्रातिसारजित् ॥
शुक्रस्तन्यकरो बल्या वातपित्तास्त्रशोथजित ।

भा.प्र.

कपिकच्छु :

कपिकच्छु भृशं वृष्यं मधुरा बृंहणी गुरु ।
तिक्ता वातहरी बल्या स्निग्धपित्तबलासकृत ॥

शंखपुष्पी :

शंखपुष्पी सरा मेध्या वृष्या मानसरोगहृत ।
रसायनी कषायोष्णा स्मृतिकान्तिबलप्रदा ॥

भा.प्र.

चंद्रशूर (अहळीव)

चंद्रशूरं हितं हिक्कावातश्लेष्मतिसारिणाम् ।
असृग्वातगरद्वेषी बलपुष्टी विवर्धनम् ॥

भा.प्र.

विदारी : Puerana Tuberosa

विदारी मधुरा स्निग्धा बृंहणी स्तन्यशुक्रदा ।
शीता स्थैर्या मुत्रला व जीवनी बलवर्णदा ॥

मुसली :

मुसली मधुरा शीता वृष्या पुष्टिबलप्रदा ।
पिच्छिला कफदा पित्तदाहश्रमहरा परा ॥

रा.नि.

गुडूची :

गुडूची कटूका तिक्ता स्वादुपाका रसायनी ।
संग्राहिणी कषायोष्णा लघ्वी बल्याग्निदीपनी ॥

भा.प्र.

वंश : bamboo

वंशजा बृंहणी वृष्या बल्यास्वाद्वी च शीतला॥

भा.प्र.

Fruits mentioned for strength enhancing effects:

१ दाडिम pomegranate

६ अक्षोटक Akrod

२	सीताफल	custard apple
३	आम्र	mango
७	पनस	Jackfruit
४	कदली	Banana
८	त्रक	Mashroom
९	अन्ननास	pineapple

Āyurveda Therapies:

Pañcakarma are unique cleansing processes suggested by Āyurveda. Those who follow regular exercise do not need cleansing processes like vamana (vomiting), for Kapha doṣa, Virecana (Purgation) for pitta doṣa and Niruha (Enema) for Vāta doṣa cleansing. Vyāyāma serves the purpose of cleansing.

Anuvāsana Basti (oil enema) and Yāpana Basti are suggested for as a Rasāyana therapy for those who follow regular exercise. It serves as restorative measure.

Benefits of Anuvāsana (oil enema) are described as follows-

संस्नेहनं वर्णबलप्रदं च ।
 न तैलदानात् परमस्ति किञ्चिद्रव्यं
 विशेषेण समीरणार्ते ॥
 स्नेहेन रौक्ष्यं लघुतां गुरुत्वादौष्ण्याच्च
 शैत्यं पवनस्य हत्वा
 तैलं दद्यात्प्राशु मनप्रसादं
 वीर्यं बलं वर्णमथाग्निपुष्टिम् ।

च.सि. १/२९.३०

oil enema reduces vāta doṣa with its unctuous heavy and hot qualities. It reduces dryness and excessive lightness of vāta doṣa. Oil enema quickly reduces vāta doṣa improves strength mental fatigue and improves digestion. Hence Anuvāsana (Oil enema) are desirable for sports persons for prevention and treatment of following conditions.

स्तब्धाश्च ये संकुचिताश्च येऽपि ।
 ये पङ्गवो येऽपि च भग्नरुग्णाः ॥
 येषां च शास्त्रासु चरन्ति वातः ।
 शस्तो विशेषेण हि तेषु बस्ति ॥

च.सि. १/३२

Those who are suffering with stiffness of muscles, joints structures, weakness of muscles, fractures, tears of ligament, bones, muscles etc are specially benefited with Basti (Enema) therapy. All these comprises to common sports injuries hence Basti is an ideal way of preventing and treating these sports injuries.

Role of Basti in Prevention of sports injuries:

Basti (enema) therapy is considered desirable for those who have predominant vāta doṣa in their extremities. Exercise is one of the factor that brings vāta doṣa to extremities from gut (colon)

व्यायामादुष्मणास्तैक्ष्ण्य अहिताचरणादपि ।

कोष्ठान् शाखास्थिमर्माणि दुतत्वान्मारुतस्य च ॥

मा.नि. १

Regular exercise and movement of limbs causes movement of vāta doṣa from gut to extremities, which may lead to constipation and vāta doṣa vitiation diseases like stiffness, fractures, tears crepitation causing various pains.

Hence for controlling excessive rise of vāta doṣa and conservation of optimum vāta doṣa in gut, basti is the best preventive measure.

Muscles are naturally porous in nature and while formation is predominantly processed with khara (excessive dry) guṇa, hence muscles are susceptible for vāta injuries like stiffness, dryness, tears, joint crepitation and pains. For this reason, regular basti act as preventive measure for these sports injuries.

Yāpana basti is another form of basti (enema) described in Āyurveda. Along with oil various herbs, milk, maṃsarasa (non-veg broth), cereals, eggs are used. Twenty-nine different formulations of Yāpana basti are mentioned in Caraka saṃhitā. These formulations are mentioned as enhancing strength in various conditions like post disease, old age or excessive exertion. These formulations serve as Rasāyana in nature. Yāpana basti is the form of enema which is anti-ageing and promotes longevity. Rāja Yāpana basti gives instant strength enhancing effects, Rasāyana, nourishment of body constituents and compensates vāta vitiation and

dhātuKṣaya. For all these qualities Yāpana Basti can be used for sports person as preventive, restorative, treatment and rejuvenation purpose.

Āyurveda Therapies for Sports Persons:

Injuries are inevitable part of any sports person's life. It may crack winning way of career. Hence for treatment, rehabilitation after injuries and prevention from injuries is very important. Ayurveda therapies mentioned in Yuktikṛta Bala plays a very important role in prevention of injuries. These therapies ranging from medicines, Pañcakarma and other treatments like lepa, bandha, sucikarma, Agni karma, blood-letting are useful in treatment and rehabilitation of injuries.

Researcher being Ayurveda doctor working in the professional football field has applied above treatments for various sports injuries. They have proved useful in treatment and recovery from injuries. Results of case studies will be discussed in next chapter.

Yoga-Therapy for Sports Person:

We have explained the means of physical aspects of Balopāsanā mentioned in Āyurveda. Existence of mind is explained while explaining the philosophy of life. Mind is believed as connecting link between physical gross body and subtle body (Ātmā /intellectual abilities). Mind is the mediator of knowledge.

लक्षणं मनसो ज्ञानस्याभावो भाव एव च ।

च.शा.१

It means without presence of mind the process of knowledge is not complete. Mind is subtle and only one.

Functions of mind are described in Āyurveda as

इन्द्रियाभिग्रहः कर्म मनसः स्वस्य निग्रहः ।

ऊहो विचारश्च, ततः बुद्धि प्रवर्तते ॥

च.शा.१/२१

Mind controls the physical body, sensory motor functions of sensory organs (indriya), controls of self and serves to choose between multiple choices where intellect is directed for action. For this faculties of mind are thinking, selection of one thought by reasoning, goal setting, desire, planning of actions, commitment etc.

चिन्त्यं विचार्यमुह्यं च ध्येयं संकल्पमेव च ।

यत्किञ्चिन्मनसो ज्ञेयं तत् सर्व व्यर्थसंज्ञकम् ॥

च. शा. १/२०

Mind is the mediator and controller between of thought and actions. Though ātmā decides the actions but it is not able to act, in association with mind and intellect ātmā is able to direct actions. In this way mind, body, self all are in closest association which is the reason of involvement of mental factor in all bodily actions.

नित्यानुबन्धं मनसा देहकर्मानुपातिना ।
सर्वयोनिगतं विद्यादेकयौनावपि स्थितम् ।

च.शा.१/९४

mind plays important role is disease production. Many of the time wrong actions are leading towards diseases which are called prajñāparādha. It is caused due to wrong actions of mental faculties leading to excessive or wrong actions by senses and body

धीधृतिस्मृतिविभ्रंशः संप्राप्तिः कालकर्मणाम् ।
असात्म्यार्थागमश्चेति ज्ञातव्या दुःखहेतव ॥

च.शा. १/९८

धीधृतिस्मृतिविभ्रष्टः कर्म यत् कुरुतेऽशुभम् ।
प्रज्ञापराधं तं विद्यात सर्वदोषप्रकोपणम् ॥
उदीरणं गतितमतामुदीर्णानां च निग्रहः ।
सेवनं साहसानां च नारीणां चातिसेवनम् ॥

च.शा. १/१०२.१०३

In case of sports persons proper consumption of exercise rest and lifestyle measures is very important in terms of maintaining performance, fitness and longevity. Mental faculties play very important role in this discipline, commitment and desire of achievement of goal. Due to mental influence distractions happen and which leads to decrements in strength, performance and health management of athletes' lifestyle. Hence for effective planning of Yuktikṛta Bala (Balopāsanā) inclusion of mental faculties becomes crucially important. For this Āyurveda has suggested Naiṣṭhikī cikitsā for effective management of treatment.

युक्तिमेतां पुरस्कृत्यं त्रिकालां वेदनां भिषक् ।
हन्तीत्युक्तं चिकित्सा तु नैष्ठिकी या विनोपधाम् ॥

च.शा. १/९४

वेदनानामधिष्ठानं मनो देहश्च सेन्द्रियः ॥

च.शा. १/१३६

आत्मेन्द्रियमनोर्थानां सन्निकर्षात् प्रवर्तते ।

सुखदुःखमनारम्भादात्मस्थे मनसि स्थिरे ॥

निवर्तते तदुभयं वशित्वं चोपजायते ।

सशरीरस्य योगज्ञास्तं भोगमृषयोः विदुः ॥

च.शा. १/१३८.१३९

Mind is the seat of pain. Close association of body, senses, mind and self (Ātmā) is the reason of positive (sukha) and negative (dukhah) things. With the help of Yoga mind can be retracted from distractions and the pain can be relieved. It is called bodily Yoga which is able to create specific powers in a person. It involves desire to achieve goals.

योगिनां बलमैश्वरम् ।

शुद्धसत्त्वसमाधानात्तत्सर्वमुपजायते ॥

च.शा. १/१४०

मोक्षो रजस्तमोऽभावाद्बलवत्कर्मसंक्षयात् ।

bodily Yoga (Sasharir Yoga) can be achieved

bodily Yoga (Sasharir Yoga) can be achieved with the help of reduction of mental doṣa Raja and Tama and improvement of Satva guṇa. Earlier in Review of literature of Yoga we have studied role of physical strength in spiritual journey of liberation (mokṣa). Here we have studied the role of mind in bodily actions and process of knowledge, disease prevention, disease creation, and holistic treatment of diseases.

With the help of these principles, we establish the holistic concept of Balopasa inclusive of Āyurveda and Yoga principles.

Now we will explain the practical implications of Yoga principles in Balopāsanā of sports persons. Yoga principles include Eight steps.

- | | |
|--------------|---------------|
| 1) Yama | 5) Pratyāhāra |
| 2) Niyama | 6) Dhāraṇā |
| 3) Āsana | 7) Dhyāna |
| 4) Prāṇāyāma | 8) Samādhī |

Out of these eight steps first five steps from Yama to Pratyāhāra is called Bahiraṅga yoga which deals with physical stability, Dhāraṇa, Dhyāna, Samadhi is called Aṅtaraṅga yoga which helps mind for achieving intellectual stability for liberation. Now we will explain the practical implications eight limbs of yoga for sports persons.

1) Yama- Universal moral commandments

Yama includes (ethical disciplines) the great commandments transcending creed, country, age and time. They are ahiṃsā (no violence) satya (truth), asteya (non-stealing) Brahmacharya (incontinence) and aparigraha (non-coveting). These commandments are the rules of morality of society and the individual which if not obeyed bring chaos, violence, untruth, stealing, dissipation and covetousness. The roots of these evils are greed. Attachments and desire which in excess are not good and cause pain. These commandments or ethical disciplines help to enhance morality of the player which is required in the sports field and society to maintain fair play, ethical principles and integrity of the field. With the help of these principles incidences of cheating, doping, match fixing can be reduced, and spirits of sports field can be maintained high keeping fair competitive spirits intact.

2) Niyama:

Niyama are the rules of conduct that apply to individual discipline. It includes

- 1) Śauca (purity)- purity of body and mind.
- 2) santoṣa- contentment
- 3) Tapas-Austerity
- 4) Svādhyāya – self study
- 5) Íśvara praṇidhāna- Dedication to the lord.

Śauca includes disciplines of lifestyle like Āhāra, vihāra etc as explained earlier. Contentment must be achieved hence removing jealousy (matsar) about opponent. Contentment helps sports person to focus on self-performance and improvement.

Tapas refers to efforts, sincere hard work to achieve goals. It is of three types kayika (bodily), mānasika (mental) and vācika (speech) Sincere and regular practice of Physical exercise along with positive attitude and positive talk helps sports person to work efficiently in training and competition to achieve best of them.

Svādhyāya (self-study): With the help of self-study sports person can analyse his own work and learn to reduce his mistakes to enhance performance.

Íśvara praṇidhāna means dedication to the lord, nature, teacher. This principle makes a sports person better student and reduces the ego.

Thus, yama Niyama helps sports persons to become moral, sincere, ethical professionals.

3) Āsana:

स्थिरसुखमासनम् । प्रयत्नशैथिल्यानन्त्यसमापत्तिभ्याम् ।

ततो द्वंद्वानभिघातः ॥

प.यो.सू. साधना पाद ४६.४६

The third limb of yoga is Āsana (posture). Āsana brings steadiness, health, lightness of limbs. A steady and pleasant posture produces mental equilibrium and prevents fickleness of mind. Āsanās are not merely gymnastic exercise, they are postures. Initially it is the body that performs Āsanās, because mind, intelligence being intangible need to be conceived and require sensitivity where as body can be perceived since it is tangible and visible. Āsanās effect not only on the body but also on breath, mind, emotions, awareness and intelligence.

Now a day's sportspersons tend to associate with Āsana for acquiring flexibility, but it offers more than that. With regular practice of Āsana one can develop endurance, flexibility agility, balance, great vitality, awareness and control over body and mind. Dualities like gain and loss, victory and defeat, fume and shame, body and mind vanish through mastery of Āsana. Journey of liberation requires physical stability and disease-free state of the body for achieving control over mind. In the same way for physical performance mind plays crucial role. In order to succeed professionally in any sports one need to be not only physically fit but also mentally alert, technically skilled, focused, committed, emotionally strong and stable and motivated.

Āsana help athletes to achieve physical and mental fitness facets altogether.

4) Prāṇāyāma:

तस्मिन् सति श्वासप्रश्वासयोगतिविच्छेदः प्राणायामः ॥

प.यो.सू.४९

Prāṇa means breath, respiration, life, vitality, energy and strength. It is the connecting link between body and mind. The word āyāma means length, expansion, stretching or restraint. Prāṇāyāma connotes extension of breath and its control.

In Haṭhayoga pradīpikā it is mentioned that

चले वाते चलम् चित्तम् निश्चले निश्चलम् भवेत् ।

It means consciousness or citta moves where the breath moves. If the breath is steady, the mind and consciousness are steady. Emotional excitement affects the rate of breathing equally. Deliberate regulation of breathing checks emotional excitement. As the very object of yoga is control and still the mind, controlling and mastering breath is the best way. This enables to control body, and senses. Once mind is under control, senses, intellect can be managed since the mind is the connecting link.

Physical exercise is associated with increase in the rate and depth of breathing to increase ventilation of lungs and increase cardiac output. These cardio respiratory adjustments ensure adequate delivery of oxygen to active muscles. During exercise oxygen demand of working muscles is increased which is supplied by circulatory system. Prāṇāyāma performed according to technique can improve oxygen concentration of blood as no other exercise. Prāṇāyāma train the respiratory apparatus to carry respiration efficiently and to absorb larger quantities of oxygen throughout the day. Thus, yogic practices of Prāṇāyāma improve functioning of cardio respiratory system enhance cardio – respiratory endurance which is the most important fitness factor as other factors of fitness are dependent of cardio respiratory endurance.

In this way Prāṇāyāma helps athletes in physical and mental, emotional and intellectual planes. It gives steadiness of body and mind required for further concentration and control over senses.

5) Pratyāhāra:

स्वाविषयासम्प्रयोगे चित्तस्वरूपानुकारे इन्द्रियाणाम् प्रत्याहारः ॥

ततः परमावश्यतेन्द्रियाणाम् ॥

प.यो.सू.

When the mind is withdrawn from sense objects, the sense organs also withdraw themselves from their respective objects and thus are said to imitate the mind. This is known as pratyāhāra. It gives complete mastery over senses.

If a man's reason succumbs to the pull of his senses, he is lost. On the other hand, if there is rhythmic control of breath, the senses instead of running after external objects of desire turns inwards and a man is set free from their tyranny. When this stage is reached a person is able to focus, concentrate and start self-examination and self-analysis.

Sports persons need concentration, self analysis and desire to achieve their goal by maintaining consistency of practice. For this they have to overcome the deadly but attractive spell of sensual objects. In this way, āsana and Prāṇāyāma help sports person to achieve pratyāhāra which makes athletes focused and his mind becomes able to hold this focus on his goal. It leads to further steps of concentration (Dhāraṇa) meditation.

6) Dhāraṇa:

देशबन्धश्चित्तस्य धारणा ।

प.यो.सू.

Dhāraṇa means binding the mind to one place. When the attention of the mind is directed in a single stream to a chosen field without being distracted, it is called as Dhāraṇa (concentration). Place means mental or physical spot. Dhāraṇa means confinement of the mind to one point, object or goal.

When the body has been tempered by Āsanas, mind is refined by the fire of Prāṇāyāma and when senses are brought under control by prayāhāra, the person is able to concentrate his mind on one goal or object. Without concentration one cannot master anything. Hence to achieve concentration ‘eka tattva abhyāsa’ (focus of one object) is recommended.

Any sport requires tremendous concentration. The mind of player must focus on the target. For example, football forwards have to focus on goalpost overcoming all the distractions of noises of crowd, deflections of opponent defenders etc. He is like Arjuna in the Mahābhārata who mastered archery to such an extent that he could target and hit the eye of a moving bird. Concentrating on Aum, imagery of tactical practices help athletes to achieve concentration needed in sports. Helps to bring excellence in a skill and perfection in actions.

7) **Dhyāna and Samādhi:**

तत्र प्रत्ययैकतानता ध्यानम् ॥

तदेवार्थमात्रनिर्भासं स्वरूपशून्यमिव समाधिः ।

प.यो.सू.

Uninterrupted stream of the content of consciousness is dhyāna. When there is no break in Dhāraṇa it is called as dhyāna. When the state of dhyāna progresses further, one forgets the consciousness of self and can only see the object. This stage it is called Samādhi. It should be noted that Dhāraṇa, Dhyāna, Samādhi are progressive stages of concentration. All these together are called ‘saṃyama’. It contains two parts ‘sama’ means perfect and ‘yama’ is control. It means mastery over physical and psychological processes.

It is needed in sports to achieve excellence, perfection and the best performance. These abilities make a player outstanding from others. For example, there are many players involved in game of football who can bring the ball towards the goal but very few players can outclass and convert it into goal.

Thus, Yoga practices of Āsana, Prāṇāyāma, meditation help athletes to achieve physical, mental, intellectual abilities required for being successful ethical professional athlete. We have

examples of sachin Tendulkar, Rahul dravid, Sourav Ganguly who have been practicing Yoga principles in training.

Table 12: Module of Balopāsānā for sports persons:

Module of Balopāsānā for Sports Persons	
Dinacaryā	
Procedures	Remark
Exercise	Considering Sahaja Bala and seasonal recommendation given in Ṛtucaryā,
Abhyanga	Recovery measure
Pādābhyāṅga	after exercise before sleep
Pratimarṣa nasya	before, during after exercise, evening
Udvardanaa	application of herbal medicinal powders
Snāna, Avagāha Śeka	Pool bath/swimming, shower
Anulepana	Application of scents after bath
Āhāra	unctous, heavy food according to aharavidhi
Divāsvāpa	before lunch or 1 hr. after lunch for half duration of training
Nidrā	night sleep for about 8-10 hours
Abstinence	frequency of intercourse should be optimum i.e. once in three days in seasons except Grīṣma where frequency should be once in 15 days
Rasāyana	
Rasāyana	In terms of Āhāra in daily routine and medicines as per Prakṛti and need
Ayurveda therapies	

Anuvāsana Basti	in Varsha, Grīṣma season as per training schedule after strenuous exercise before and after competitions for treatment of sports injuries
Yāpana Basti	for recovery after strenuous competitive schedule for treatment of sports injuries
Yoga Practices	
Āsana	before/after training as per training requirement can be used as training modality, recovery measures treatment of sports injuries
prāṇāyāma	Before, during after exercise,
Meditation	Before training and competitive schedule
Relaxation	After training and in the evening for recovery and relaxation

Practical Applicability of module of Balopāsana is verified with various case studies and few research studies by researcher. Case studies include application of ayurvedic therapies, lifestyle management as per Dinacaryā and Āhāra considering Ṛtucaryā. These practices are applied either as treatment and rehabilitation of sports injuries or as lifestyle module for athletes. It included daily diet, rest and treatment according to training and competitive schedule.

Along with these studies, based on yogic principles of Balopāsana researcher has conducted 2 practical application-based studies.

- 1) The Role of Yogic practices to enhance cardio respiratory endurance and qualitative fitness of school athletes.
- 2) The Role of Yogic practices in football players.

All these studies showed significant positive effects of inclusion of Balopāsana practices in training of athletes on cardiorespiratory endurance, recovery, concentration and mental facets like confidence, relaxation etc. Detailed Results of these studies are discussed in next chapter.

3.6 Vyāyāmaja Balakṣaya:

While pursuing professional sports, athletes need to strive through regular strenuous training sessions to achieve elite level of physical fitness and maintenance for extensive period of

life. These prolonged sessions exert more stress and causes early wear and tear of the body of athletes. As we have studied that, Āyurveda has suggested half capacity exercise for strength, health and longevity. But in practical, it becomes difficult to maintain this limit for all training sessions. It becomes critical in team sports training as every athlete's capacity and fitness is of different. Hence, it becomes necessary to observe the effects of exercise of athletes on health along with strength, since it causes excessive wear and tear. If this wear and tear is not compensated timely, it leads to adverse effects on performance and health of athlete.

Concept of progressive overloading is applied in training periodization to achieve desired level of fitness. During each phase of overloading while athlete experiences super compensation that results improved performance. But if overloading is not accompanied with proper rest and recovery, the ability of body to adapt to the training is affected and leads to performance decrements. If this condition persists or training intensity is maintained at high level for longer duration it may lead to overtraining syndrome.

Hence one of the most difficult challenges that athletes and coaches face is determining appropriate training stimulus that optimizes performance without affecting health of an athlete. effects of excessive exercise on body constituents and its effects on strength (Bala) are described in detail in Āyurveda. This is called as vyāyāmaja Balakṣaya. With the help of this concept, assessment of exercise induced strength reduction (Balakṣaya) can be done and preventive restorative management can be planned.

Effects of Excessive Vyāyāma:

Vyāyāma is considered as one of adventure (sāhasa) in Āyurveda and its excessive practice is contraindicated. Effects of excessive exercise are described as –

श्रमः क्लमः क्षयस्तृष्णा रक्तपित्त प्रतामकः ।

अतिव्यायामतः कासो ज्वरश्छर्दिश्च जायते ॥

च.सू.७/३३

symptoms of excessive exercise or exercise without rest are as follows-

- Shrama - fatigue
- Klama- fatigue and drowsiness
- Kṣaya Decrease in body constituents
- Raktpitta - Bleeding disorder
- pratamaka- Respiratory disorders, breathlessness, respiratory arrest

- Jvara - fever
- Kasa - Cough
- Chharchi - vomiting

it has been directed that excessive Vyāyāma (exercise) leads to dhātu Kṣaya which further leads to reduction in Oja and Bala (strength) Effects of Vyāyāma on each body constituents.

Effects of Exercise on Body constituents:

Exercise one of the cause of dhātu Kṣaya:

व्यायामोऽनशनं चिन्ता रुक्षाल्पप्रमिताशनम् ।

वातातपौ भयं शोको रुक्षपानं प्रजागरः॥

क्षयहेतवः ॥

च.सू. १७/७६.७७

As discussed in definition and benefits of Vyāyāma (exercise) it is not harmful to basic doṣa-dhātu equilibrium of the body. Hence Vyāyāma referred in causes of dhātuKṣaya either excessive Vyāyāma in terms of intensity or duration.

Vyāyāma is associated with excessive sweating which in turn causes decrease in kapha and increase in vāta doṣa.

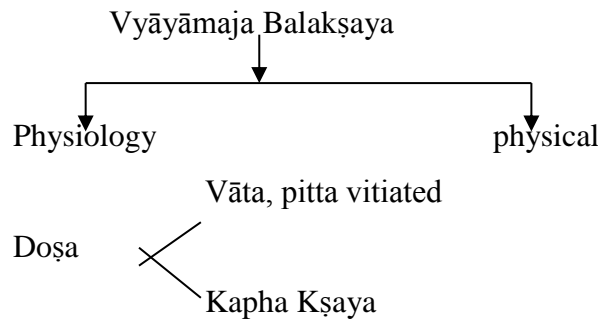
प्रत्यहं क्षीयते श्लेष्मा तेन वायुश्च वर्धते ।

अ.ह. ३/२७

in the same way it also causes increase in pitta doṣa.

Thus, while assessing the effects of excessive exercise has to be taken into consideration. Doṣa status involves vitiated vāta, pitta doṣa, reduction in Kapha doṣa and progressively it affects dhātu Kṣaya. Hence it is needed to consider physical and physiological symptoms of doṣa and dhātu condition in assessment.

Figure 3 Vyāyāmaja Balakṣaya



Decrease in body constituents.

Symptoms of these physiological and physical aspect is described in Āyurveda as follows,

Symptoms of Doṣa Vitiation :-

Vāta Doṣa :- वृद्धस्तु कुरुतेऽनिलः ।

कार्श्यकाष्प्योष्णकामित्व कम्पानाहशकृत्ग्रहान् ।

बलनिद्रेन्द्रियभ्रंश प्रलापभ्रमदीनता ॥

वा.सू. ११/६

symptoms of increased vāta doṣa include leanness, decreased complexion, constipation, instability, reduction in strength, insomnia, fainting and weakness. With respect to exercise, increased Vāta doṣa causes specific symptoms caused due invasion of Vāta into body constituents. Its symptoms are as follows,

गुर्वङ्गं तुद्यतेत्यर्थ मांसमेदोगतोऽनिले ।

भेदोऽस्थिपर्वणां सन्धिशुलं मांसबलक्षयः ।

अस्वप्नः संतता रुक् च मज्जास्थिकुपितेऽनिले ॥

च.चि. २८/३२.३३

it causes deep excruciating muscular pain, heaviness of muscles, cracking pain of joints, muscle weakness, inability to falling asleep and constant pain when Vāta doṣa enters Māṅsa, majja and asthi doṣa. These symptoms are observed in varius sports injuries like muscle ligaments tear, fractures etc.

Pitta Doṣa:

पीतविष्मुत्रनेत्रत्वक् क्षुतृडदाहाल्पनिद्रता ॥

वा.सू. ११/७

Yellowish urination, excessive hunger, thirst, burning sensation of legs, hands, eyes and inability to sleep. These symptoms are observed due to increased pitta doṣa.

Kapha Kṣaya:

श्लेष्मक्षये रुक्षताऽन्तर्दाह आमाशयेतरश्लेष्माशयशून्यता सन्धिशैथिल्यं (तृष्णा दौर्बल्यं प्रजागरणं च)

सु.सू. १९/७

कफे भ्रमः।

श्लेष्माशयानां शुन्यत्वं हृद्रवः श्लथसंधिता ॥

वा.सू. ११/१६

Kapha doṣa is decreased as a result of exercise. It causes dryness of skin, burning sensation, laxity of joints, excessive thirst giddiness and palpitation

Decreased body constituents:

रस रसे रौक्ष्यं श्रमः शोषो ज्वानिः शब्दासहिष्णुता ॥

वा.सू. ११/१७

रसक्षये हृत्पीडाकम्पशून्यतास्तृष्णा च ।

सु.सू. १५/९

घट्टते सहते शब्दं नोच्चेद्रवति शूल्यते ॥

हृदयं ताम्यति स्वल्पचेष्टस्यापि रसक्षये ॥

Rasa: Dryness of skin, fatigue, drowsiness, intolerance to sound. Chest pain, increased heart rate on very low exercise stimulus.

च.सू. १७/६४

रक्त :

रक्तेऽम्लशिशिरप्रीति सिराशैथिल्यरुक्षताः ॥

वा.सू. ११/१७

शोणितक्षये त्वक्पारुष्यम्लशीतप्रार्थना सिराथैथिल्यं च ॥

सु.सू. ११/९

परुषा स्फुटिता म्लाना त्वग्युक्षा रक्तसंक्षये ।

Rakta kshya: Dryness of skin, craving to eat sour and cold liquids (excessive heat production)

च.सू. १७/६५

मांस :

मांसेऽक्षज्वानिगण्डस्फिकशुष्कता सन्धिवेदना ॥

वा.सू. ११/१८

स्फिग्गण्डौष्ठोपस्थोरुवक्षकक्षापिण्डोर ग्रीवाशुष्कता रौक्ष्यतोदो

गात्राणां सदनं धमनीशैथिल्यं च ॥

सु.सू. १५/९

मांसक्षये विशेषेण स्फिग्ग्रीवोदरशुष्कता ।

सन्धिनां स्फुटनं ज्वानिरक्षणोरायास एव च ॥

च.सू. १७/६५

Mānsa Kṣaya: Drowsiness, muscle wasting (it refers to reduction in girth of muscle) weakness. Muscle wasting especially at cheek, buttock, chest, neck, Muscular pain, joint pain, heavyness of limbs.

मेदक्षयः

मेदसि स्वपनं कटयाः प्लीहो वृद्धीः कृशाङ्गता ।

वा.सु. ११/१८

मेदक्षये प्लीहाभिवृद्धिः सान्धिशून्यता रौक्ष्यं मेदुरमांसप्रार्थना च ।

सु.सू. १५/९

सन्धीनां स्फुटनं ग्लानीरक्षणोरायास एव च ।

लक्षणं मेदसि क्षीणे तनुत्वं चोदरस्य च ॥

च.सू. १७/६६

Meda Kṣaya: Lower back pain, increased spleen size, weight loss, joint laxity, joint pain, dryness, joint crepitations.

अस्थिक्षय

अस्थ्यस्थितोदः शदनं दन्तकेशनखादिषु ।

वा.सू. ११/१९

अस्थिक्षयेऽस्थिशूलं दन्तनखोभङ्गो रौक्ष्यं च ।

सु.सू. १५/९

केशलोमनखश्मश्रुद्विजप्रपतनं श्रमः ।

ज्ञेयमस्थिक्षये लिङ्गं सन्धिशैथिल्यमेव च ॥

च.सू. १७/६७

AsthiKṣaya: Bony pain, stress fractures, dental pain hairfull, joint laxity.

मज्जाक्षय

अस्थनां मज्जनि सौषिर्यं भ्रमस्तिमिरदर्शनम् ।

वा.सू. १७/१९

मज्जाक्षये अल्पशुक्रतापर्वभेदोऽस्थितोदऽस्थिशून्यता च ।

सु.सू. १५/९

शीर्यन्त इव चास्थिनि दुर्बलानि लघूनि च ।

प्रततं वातरोगीणि क्षीणे मज्जनि देहिनाम् ॥

च.सू. १७/६८

Majjā Kṣaya: Giddiness, darkness in front of eyes, recurrent body aches, joint pains. Small joint pain.

शुक्रक्षय

शुक्रं चिरात् प्रसिच्येव शुक्रं शोणितमेव वा ।

तोदोत्यर्थं वृषणयोः मेढ्रं धुमायतिव च ॥

वा.सू. ११/२०

शुक्रक्षये मेढ्रवृषणवेदनाऽशक्तिमैथुने चिराऽद्वा प्रसेकः ।

प्रसेके चाल्परक्तशुक्रदर्शनम् ॥

वा.सू. १५/९

दौर्बल्यं मुखशोषश्च पाण्डुत्वं सदनं श्रमः ।
क्लैब्यं शुक्राविसर्गश्च क्षीणशुक्रस्थ लक्षणम् ॥

च.सू. १७/६९

Śukra Kṣaya: Weakness, immune function reduced, fatigue, sex, drive reduced, complexion reduced.

ओजक्षय :

बिभेति दुर्बलोऽभीक्षणं ध्यायति व्यथितेन्द्रियः ।
दुश्छायो दुर्मना रुक्षः क्षामश्चैवौजयः क्षये ॥

क्षय कारणे

अभिघातात्क्षयात्कोपाच्छोकाध्यानाच्छमात्क्षुधः ।
ओजः संक्षीयते ह्येभ्यो धातुग्रहण निःसृतम् ।
तेजःसमीरितं तस्मद्विघ्नंयति देहिनाम् ।

सु.सू. १५/२३

Oja Kṣaya: anxiety, Fear of failure, feace of opponent performance anxiety, inability to concenterate. Frustration (depression), dryness, loss of interest.

च.सू. १७/७३

बलदोष :

तस्य विस्त्रंसो व्यापत् क्षय इति त्रयो दोषाः ।

सु.सू. १५/२४

लक्षणे :

त्रयोदोषा बलस्योक्ता व्यापद्विघ्नंसनक्षयाः ।
विश्लेषसादो गात्राणां च बलविस्त्रंसन श्रमः ॥
अप्राचुर्य क्रियाणां च बलविस्त्रंसलक्षणम् ।
गुरुत्वं स्तब्धताऽङ्गेषु ग्लानिर्वर्णस्य भेदनम् ॥
तद्द्रा निद्रा वातशोको बलव्यापदि लक्षणम् ॥
मुर्च्छा मांसक्षयो मोहो प्रलापोऽज्ञानमेव च ।
पुर्वोक्तानि च लिङ्गानि मरणं च बलक्षये ॥

सु.सू. १५/२५.२७

Table 13: Types of Baladoṣa

बलविघ्नंस	बलव्यापद	बलक्षय
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संधिविश्लेष	गुरुगात्रता स्तब्धगात्रता	मुच्छ्रा
गात्रसाद	ग्लानि	मांसक्षय
दोषच्यवन	तन्द्रा	मेह
शुक्रयासन्निरोध	निद्रा व्यापद	प्रलाप मरण

These dhātukshya produce three types of dysfunction of strength (Bala) called as Bala visraṅsa, Bala vyāpad and Bala Kṣaya (reduction of strength it's symptoms are explained in Suśruta saṁhitā as follows-

Table 14: Symptoms of Baladoṣa

Balavisransa	Balavyapad	Balakṣaya
Joint afflictions Bodyache, Doṣa vitiations	-Body heaviness stiffness of joints -muscles, fascias -Drowsiness -Excessive yawning but unable to sleep -insomnia	Fainting Muscle wasting Disorientation Death

These symptoms of dhātu Kṣaya, balakṣaya are taken into consideration while designing assessment module of vyāyāmaja Balakṣaya.

Table 15: Symptoms involved in gradation of vyāyāmaja Balakṣaya

Vyāyāmaja Balakṣaya Grade	Symptoms	Interpretation
0	Off field: No any present complains, No history of previous illness & injury.	
	On Field Assessment Symptoms:	

	Swedagam	Sweating
	Shwasvruddhi	Increased Respiratory rate
	Gatranam Laghavam	Relaxation of Joints
	Hridayadyuparodha	Increased Heart rate
I	Shrama	Fatigue
	Shosha	Excessive thirst
	Hridayam tamyati swalpchestasyapi	increased heart rate on less exercise stimulus
	Glani	Sleepiness
	Shabdasaahishnuta	intolerance to noise
	Stambha	Muscular Cramps
II	Klama	Fatigue with subnormal exertion
	Rukshata, Parushata	Dryness of skin, joints, muscles
	Sandhisphutan	Joint crepitations
	Sandhivedana	Joint pain
	Katiswapanam	Lower back ache
	Krushata	Weight loss
	Gand sphik shushkata	Dryness / muscle wasting at cheek & buttock region
	Jwara	Fever
	Kasa (shramaj)	Cough

III	Kasa ++	Cough
	Chhardi	Vomiting
	Raktapitta	Burning sensation in palms & soles.
		Epistaxis, blood in vomiting, cough, bleeding piles, blood in urine.
	Sandhishathilya	Laxity in joints
	Asthitod	Throbbing pain in bones, joints (Periostitis)
	Khalitya & palitya	hair fall and hair graying
	Sheeryant Asthi	Recurrent & easy fractures in bones
	Shrama	Fatigue, Staleness
	Dourbalya	fatigue not recovering even after
	Panduta	Paleness
	Bibheti	Anxiety, Fear of failure, Fear of opponent/competition, frustration due to decreased performance

Based on these symptoms gradation scale of assessment of Vyāyāmaja Balakṣaya is designed by researcher. Pilot study to understand the practical applicability and relevance of these symptoms with sports was conducted. This study proved that gradation scale of Vyāyāmaja Balakṣaya is practically applicable in sports field and it is useful for diagnosing overtraining syndrome in sports. Detailed results of this study are explained in chapter 4 of this study.

Table 16 Assessment module of gradation of Vyāyāmaja Balakṣaya

Vyāyāmaja Balakṣaya	Symptoms	Interpretation
----------------------------	-----------------	-----------------------

Grade		
0	Off field: No any present complains, No history of previous illness & injury.	
	On Field Assessment Symptoms:	
	Svedāgam	Sweating
	Śvasvrudhi	Increased Respiratory rate
	Gātrānām Lāghavam	Loosening/Relaxation of Joints
	Hrudayādyuparodha	Increased Heart rate
I	Śrama	Fatigue
	Śoṣa	Excessive thirst
	Hrudayam tāmyati swalpcēṣṭāsyapi	increased heart rate on less exercise stimulus
	Glāni	Sleepiness
	Śabdāsahiṣṇutā	intolerance to noise
	Stambha	Muscular Cramps
II	Klama	Fatigue with subnormal exertion
	Rukshatā, Paruṣatā	Dryness of skin, joints, muscles
	Sandhisphuṭan	Joint crepitations
	Sandhivedanā	Joint pain
	Kaṭisvapanam	Lower back ache

	Kruśatā	Weight loss
	Gand̥sphik śuśkatā	Dryness / muscle wasting at cheek & buttock region
	Jvara	Fever
	Kasa (śramaj)	Cough
III	Kasa ++	Cough
	Chardi	Vomiting
	Raktapitta	Burning sensation in palms & soles.
		Epistaxis, blood in vomiting, cough, bleeding piles, blood in urine.
	Sandhiśaithilya	Laxity in joints
	Asthitoda	Throbbing pain in bones, joints (Periostitis)
	Khālitya & pālitya	hair fall and hair graying

Chapter 4

Results and discussions to understand the relevance of Balopāsanā modules with Kṛīḍāvaidyaka (Sports Medicine)

Present study is oriented towards exploration of concept of Balopāsanā from Sanskrit literature to develop modules of Balopāsanā with special relevance to Kṛīḍāvaidyaka (Sports medicine). As discussed earlier, present study is divided into two parts viz; literary part and application part. Literary part dealt with thorough study of concept of Balopāsanā and its various contexts in Sanskrit literature. Further exploration of concept of Balopāsanā with special relevance with present sports medicine (Kṛīḍāvaidyaka) is done. This exploration revealed the availability of information regarding various aspects of bala. It can be enlisted as follows,

- Types of bala
- Aspects involved under the umbrella of concept of Bala
- Assessment of bala
- Role of exercise, nutrition and lifestyle on development of bala
- Effects of climate, geography on bala
- Effects of proper exercise, non-exercise, overexertion and diseases on bala
- Role of use of medicinal herbs and therapies on development of bala
- Role of yogic practices on development of bala

While working in professional sports field researcher felt these ageold principles of balopasana are still relevant to the need of holistic fitness development of an athlete. Hence to understand the applicability of these principles of bala, modules of Balopāsanā were developed to suit the present sports medicine set-ups where researcher was working. This module included assessment module of Trividha Bala and vyāyāmaja Balakṣaya and holistic Balopāsanā module for sports persons as presented in earlier chapters of this study. Further, to understand the relevance of these modules researcher has done several applications-based case studies. Results of these studies will be discussed in this topic.

These studies were directed to understand the practical applicability of the module. It included three survey studies and few case studies. Survey studies included:

1. Study of Practical Application of Assessment module of Trividha Bala
2. Results of case studies conducted to study the effects therapies involved in Balopasana module
3. The Role of Yoga Practices in the Development of Health of Football Players
4. application of assessment of Vyāyāmaja Balakṣaya module

These studies and case studies were conducted at various sports institutes including Kridakul, Jnana Prabodhini, Nigdi, Pune, Millennium National School, Pune, Liverpool International Football Academy, DSK Shivajians Football Club, Pune and NorthEast United Football Club, Guwahati during June 2012 to January 2017. Methodology of each study is discussed separately as follows.

4.1 Results of application of module of Assessment of Bala

Study of Practical Application of Assessment module of Trividha Bala:

As explained in earlier chapter module of assessment of Trividha Bala was designed. This module of assessment is reviewed by five senior Ayurveda Physicians and coaches. 100 sports persons in different settings were assessed with the module. Assessment is conducted in two parts were as follows:

1. On field assessment of Vyāyāmaśakti: where athletes were observed during their physical fitness test or training sessions & tested with trifold assessment after session for understanding the response to exercise load, & recovery time physical symptoms after exercise.
2. Followed by on field assessment: Domain I, II, III of assessment module were conducted in medical room by physicians with trifled assessment method scoring of parameters is done & gradation of Trividha Bala is done & its interpretation & suggestions were shared with coaching department Data collection was conducted in Jnana Prabodhini, kridakul Nigdi, Millennium national school Pune, DSK international Football academy Pune.

Observations:

- It has been observed from this study that, it is practically possible to diagnose Trividha Bala of an individual with the help of Ayurveda's Assessment methods.
- Table of Gradation

Table 17: Observations of gradation of assessment of Bala

Pravara Bala	A	11
Madhyam Bala	B+	45
Madhyam Bala	B	33
Hin Bala	C	10

- Scoring system proved helpful in bringing objectivity & uniformity in the assessment.
- The present module of assessment is practically applicable to assess trifold Bala.

Researcher being working in professional football field, observations of Prakṛti of footballers playing at various positions was done according to this module. In the game of football these positions have specific role and responsibilities. It requires suitable physical and psychological characters. Observations of these characters and Prakṛti was done and correlation was studied. It reflected following correlation:

Table 18: Observations of Prakṛti and positions of play in Football

Significance of Module: – To the of	Goalkeepers	Pitta Kapha	Assessment best knowledge researcher, it is
		Kapha pitta	
	Defenders	Kapha Vāta ,	
	Wingers	Vāta pitta	
		Vāta Kapha	
	Midfielders	Pitta vāta	
	Forwards	Pitta Kapha	
		Vāta Kapha	

the first assessment module developed especially for assessment of sports persons. Based on Ayurvedic Principles.

- Predictions of innate sporting ability & suitable games was uniqueness of this module.
- This assessment module is directive towards possible future risk factors for an athlete.
- This assessment module can be directive for strategic Planning of training Load & restorative lifestyle to prevent possible risk factors. & conservation of sport fitness.

Limitations:

- As participants were already in the sports set up it was not possible to check the interpretation of assessments.
- After using the assessment module researcher feels the need of inclusion of more anthropometrical measures in the sārātā assessment.
- Researcher felt need of objectivity in the satva parīkṣā.

Recommendations:

- Reliability of this assessment module can be studied by applying this module on larger sample.
- Co-relation of Bala & sports performance can be studied in future.

Implications:**To Ayurveda.**

- Exploration of new assessment module of Trividha Bala with special relevance to sports.
- Interdisciplinary research protocol development.

To Sports:

- Comprehensive module of assessment of holistic fitness.
- It will be helpful in appropriate be game selection to ensure future success.
- Easy method for suitable game selection.

- It will be easy method to understand future risk factors of athletes & preventive measures can be planned beforehand.

4.2 Results of case studies conducted to study the effects therapies involved in Balopasana module:

Researcher being Ayurveda physician has applied various practices of Balopāsānā module while working with professional football players. It included lifestyle management of footballers considering training and competitive schedule. It includes application of

1. principles of Āhārvidhī in planning of nutrition and dietetics of individual player and entire team
2. Application of Ayurveda therapies for various purposes

Results of these applications can be explained as follows:

1. Application of Principles of Āhārvidhī for Football Players:

Principles of Āhārvidhī as explained in Balopāsānā module were taken into consideration in planning of nutrition and dietetics of football players. Following points were taken into consideration while doing this.

Table 19: Factors of application of Āhārvidhī for football players

Individual Nutrition	Player's	Team Nutrition
Prakṛti		Training type
Position of play		Training time
Origin		Competitive season
Body composition		Ṛtucaryā: Varṣā: Roasted meat

	Śiśira, hemant: soups as recovery foods
	Gṛīśma, śarada: Panake as recovery drinks
Training	Special nutrition planning on day of game

With the help of Āhārvidhī, regular planning of diet of individual player and team was done considering training and competitive season.

This proved useful in effective planning of nutrition and dietetics to meet individual requirements of players, training and competition requirements during travelling and acclimatization. On individual level it helped players to enhance stamina, confidence, accuracy in play and overall teams showed improved performance on terms of time.

4.2.1 Case studies of application of Balopāsanā practices on sports persons

Application of Ayurveda therapies for various purposes:

Researcher being Ayurveda Doctor has applied Ayurveda therapies while working in the professional sports field. It included practices mentioned in Yuktikṛta Bala and other Ayurveda practices. These practices were included in lifestyle management of athletes, treatment and rehabilitation of various sports injuries. Practices involves in Dinacaryā played a very important role in prevention of injuries. Effectiveness of Ayurveda practices on sports persons was studied on case to case basis. Results of these case studies can be presented as follows:

Table 20: Observations of results of case studies of application of Āyurveda therapies for athletes

Sr. No	Ayurveda Therapy	Effectiveness
--------	------------------	---------------

1	Abhyanga, Pādābhyāṅga	To relieve fatigue, better recovery, to reduce burning sensation of feet, strengthening of muscles and joint structures like ligaments, improves flexibility
2	Nasya	Reduces shortness of breath, muscle spasms especially of neck and shoulder, reduces allergy, Reduces insomnia improves respiratory endurance
3	Sucikarma	instantly relieves Muscular spasms Reduces pain Improves alertness relieves ligament strain
4	Agni karma	TA tendinitis, joint pain (knee pain)
5	Lepa,	relieves swelling, pain useful in soft tissue injuries reduces swelling and pain of joints
6	Bandha	Gives support useful in immobilization of joints and muscles facilitates movement of joints, muscles
7	Bloodletting with application of Leeches	to reduce abscess relieves muscle spasm or soreness
8	Taildhārā	useful in post-surgical rehabilitation reduces stiffness of muscles after fracture useful in treating muscular atrophy
9	Basti:	muscle strains, post-surgery rehabilitation
10	Ayurvedic Medicines	various complains of digestion like acidity, constipation, diarrhea, cold, cough, fever etc.

Results of Effects of Yoga Practices on development of health of football players

Title: The Role of Yoga Practices in the Development of Health of Football Players: A Practice Based Qualitative Study

Objectives:

- To study the qualitative effects of regular Yogic Practices on physical & psychological health of football players.
- To understand the perspective of football players towards regular yoga practice

Materials and methods

- 60 male professional footballers aged between 15 to 25 years were subjected to 12 weeks regular Yoga practices (90min/week in two sessions)
- Yoga Practices including
 - ✓ physical postures (Āsanas),
 - ✓ Sun Salutation & its modifications
 - ✓ voluntary regulated breathing (Prāṇāyāma),
 - ✓ Omkar & meditation techniques
- Written Feedback was collected from players
- Coaches & technical experts were interviewed

Observations of coaches & experts were also collected and analyzed.

Observations:

Table 21 Observations of effects of Yoga practices on Football Players

Type of effects	Qualitative observed	Effects	Percentage score%
Physical	Relaxation		58

	improved stretching/Flexibility	52
	Improved Balance	22
	Improved Breathing capacity	32
	Reduction in muscle soreness	13
	Hunger	2
	Sleep	13
	Recovery from training	22
	Improves strength	7
	Reduction in Fatigue	8
Psychological	Relaxation	60
	Concentration	37
	Positive mood changes	38
	Boring	12
	Sleep	12
	Recovery from training	15
	Reduction in Stress	12
	Reduction in Fatigue	8
	Motivation	8

Figure 4: Observations of physical effects of yoga practices

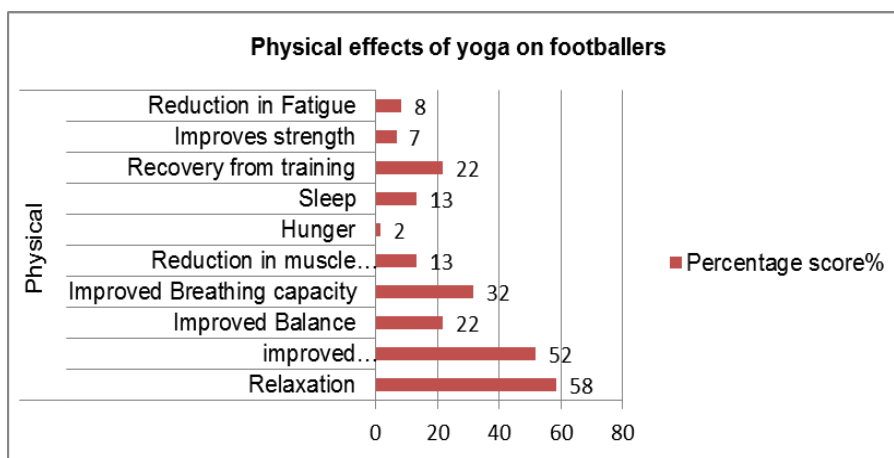
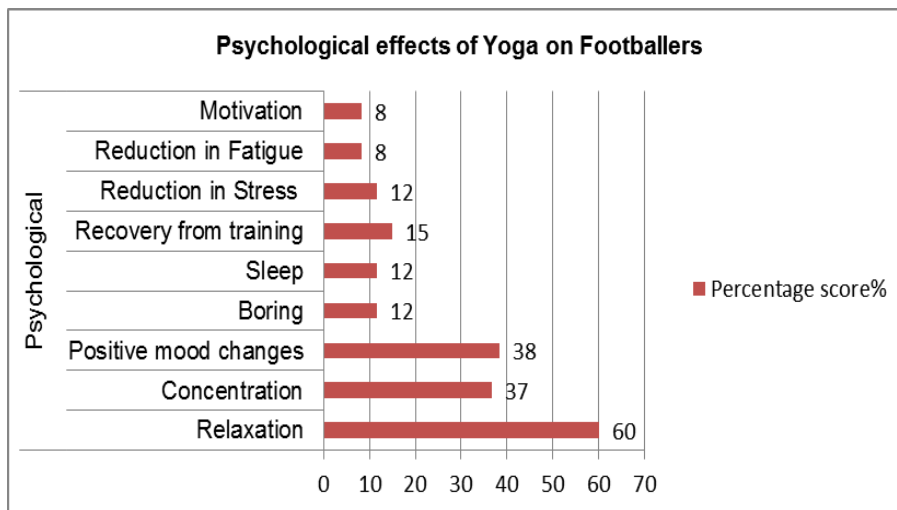


Figure 5: Observations of psychological effects of yoga practices



Discussion:

➤ Effect of Āsanas on Cardiorespiratory System:

- Bhujangāsana, Shalabhāsana and Dhanurāsana alternately exert an increased pressure on the heart & same thing is done by the first stages of Sarvangāsana, Viparitkarni and Halāsana.
- Alternate increase & decrease in pressures brought about by Āsanas promote a healthy heart & thus add to the efficiency of the circulatory system to supply fuel & oxygen.

➤ Role of Prāṇāyāma in Physiological Adaptations for Physical Exercise:

- During physical exercise oxygen demand of working muscles is increased, which is supplied by circulatory system. The quantity of oxygen, the blood can carry, mainly depends upon efficiency of respiratory system.

- Prāṇāyāma performed according to the technique can improve the oxygen supply of blood as no other exercise. Prāṇāyāma exercises train the respiratory apparatus to carry respiration efficiently & to absorb larger quantities of oxygen throughout the day.
- In Kapalbhāti, vibrations are generated and spread out in nearly every tissue of human body, the arteries, veins, capillaries are included. Thus, circulatory system is exercised & massaged during Prāṇāyāma & prepared for efficient functioning.

Effect of Yoga on Flexibility & Strength:

Release Tight Fascia and Increase Flexibility

Heavy training loads without adequate stretching can result in a loss of range of motion around joints as muscles become tight. This may result in a reduction in mechanical efficiency and cause muscular imbalances that reduce speed, power, balance and agility, and increase the risk of injury. Specific yoga postures improve flexibility by moving the body through a range of dynamic and static stretches that encourage a relaxation response in muscles and fascia, restoring joint range of movement.

Strength

Yoga poses require functional muscular effort. Integrated body movements are encouraged, including core control, as you lift your own body weight and move through the sequence. Improving strength through a full range of movement helps reduce the risk of injury. Core muscles and stabilizing muscles are recruited throughout the practice, providing a solid foundation on which to build further sport specific strength and power.

Effect of Yoga on Co-ordination, Balance and Agility

- **Improve Co-ordination, Balance and Agility**
- Co-ordination can be improved by maintaining contraction and relaxation of different muscle groups as the poses take you through all planes of movement.
- Yoga poses require integration of the whole body and draw on your balance skills.

- Co-ordination allows muscle groups in the body to relate to one another, and balance allows you to relate to your environment.
- Improved co-ordination enhances balance, and balance improves agility.

Psychological Health Benefits of Yoga

- The ability to create a stress-free mind is a significant benefit of yoga practice. The physical practice is used as a tool to enhance breath control, which helps improve focus and concentration, allowing clarity of thought and clear decision making. A valuable tool in any sporting arena.
- Mental practice in any sport will teach you how to gain control of your emotional states, so arousal levels and anxiety don't impede your performance.
- Meditation is a mental practice proven to:
 - Reduce anxiety and stress
 - Improve cognitive function
 - These benefits combine to allow for better rest, sleep and recovery, as well as provide the ability to think more clearly under pressure.
 - Motivation level can be enhanced

Recommendations:

- Yoga should be incorporated in training of footballers from an early age to promote their overall physical, as well as psychological health, including but not limited to relaxation, flexibility, and concentration.
- Physical fitness enhancement, Maintenance of health, Treatment of injuries

Rehabilitation, Prevention of injuries & chronic ill effects of prolonged exercise are the possible benefits from yoga for football players

4.3 Results of application of assessment of Vyāyāmaja Balakṣaya module

Aim:

To develop an assessment module of Vyāyāmaja Balakṣaya in sports persons on Ayurvedic principles

Objectives:

- 🕒 To assess the effect of training to define Vyāyāmaja Balakṣaya of sports persons based on Ayurvedic principles.

Materials and methods:

Thirtyfour male & female athletes of age group 12 to 15, exposed for same training sessions were selected as sample for assessment. These athletes were performing individual sports events including running, throwing, jumping.

Duration:

This specifies the duration in which assessment of athletes for Vyāyāmaja Balakṣaya was conducted. Pre-competitive period was selected which included skill and stamina training. Assessments were conducted in immediate pre-competitive period tentatively 15 days before competitions. assessment and intervention system to regularise training of sports persons

This project is planned as single group pre-post quasi experimental design.

Effects of training were judged by difference between pretest and posttest readings as per assessment tool.

Designing Vyāyāmaja Balakṣaya Gradation Scale:

gradation scale for assessment of Vyāyāmaja Balakṣaya was designed by researcher on the basis of Ayurvedic principles of Vyayam.

Ayurveda defines Ardhaśakti Vyayam as the limit of Vyayam which can be regularly practiced without any harm. If exercise is practiced beyond this limit frequently without rest, leads to adverse effects on Dosh-Dhatu constitution of body. These are called as Ativyayama lakshane.

Taking all this into consideration researcher has designed Vyāyāmaja Balakṣaya gradation scale. This scale is based on Trividha parikshan in Ayurveda. It includes four grades which are coded as grade 0, I, II, III respectively in ascending order. It denotes increasing degree of Vyāyāmaja Balakṣaya.

Data collection:

Two types of assessment formats were designed by researcher as follows:

1. Off field assessment format
2. On field assessment format

These formats were reviewed used by other 3 Ayurvedic doctors in the institution. Data collection was done with the help of these formats as follows:

1. Off field assessment:

These assessments were conducted by researcher in clinic irrespective of training session before on field assessment exclude the effect of contributing factors of Vyāyāmaja Balakṣaya and other physiological and pathological condition resembling overtraining syndrome. It included general & systemic examinations like height, weight, previous history of injury & illness with respect to game was assessed. Physical examinations included pulse, respiration bowel & game specific examinations for Stambha (muscular spasms, cramps); Shool (pain) was conducted.

On field assessments:

These assessments were conducted on the field before and after training session. Pre-session and post session readings were noted and response to training was judged accordingly.

Assessment included general physical examination of players including pulse, body temperature, sweating, muscle spasms, joint and muscle pain before and after session. Some questioning will be done to note recovery before and after session, some Vyāyāmaja Balakṣaya symptoms like excessive thirst, excessive appetite etc. Rest & diet factors were assessed here.

Accordingly, response of player to training session was assessed and status of Vyāyāmaja Balakṣaya was decided as per gradation scale.

Data analysis:

Collected data is analyzed qualitatively and quantitatively.

Classification of data is done with respect as per

1. Gender
2. Game
3. Symptoms
4. Classification as per gradation of Vyāyāmaja Balakṣaya by comparing pre and post training examination.

Results:

Total sample of 34 included both male & female athletes of age 12 to 15.

Table 22: Classification of gender in assessment of Vyāyāmaja Balakṣaya

Male	Female
17	17

This shows equal distribution of sample with respect to gender.

Table 23: Gradation of Vyāyāmaja Balakṣaya in pre and post assessment

Vyāyāmaja Balakṣaya Grade	Pre Off Field Assessment	On field Assessment 1	On field Assessment 2	On field Assessment 3	Post Off Field Assessment
0	52.94%	35.29%	17.64%	32.35%	23.52%
I	32.35%	47.05%	38.23%	20.59%	38.23%

II	14.70%	8.82%	32.35%	26.47%	26.70%
III	00	00	00	5.88%	8.82%
Rest	00	2.94%	5.88%	2.94%	00
Absent	00	5.88%	5.88%	8.82%	2.94%

Figure 7: Gradation of Vyāyāmaja Balakṣaya in pre and post assessment

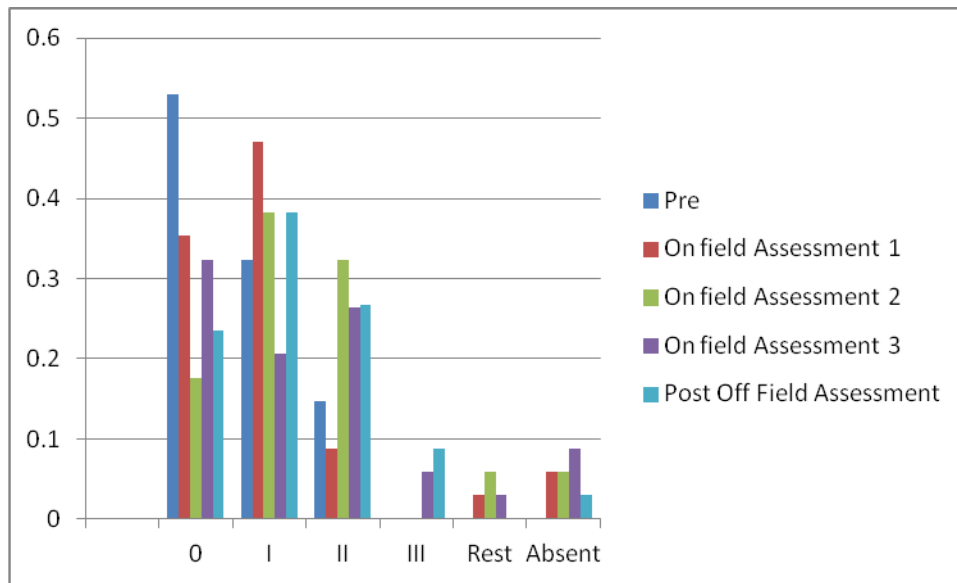
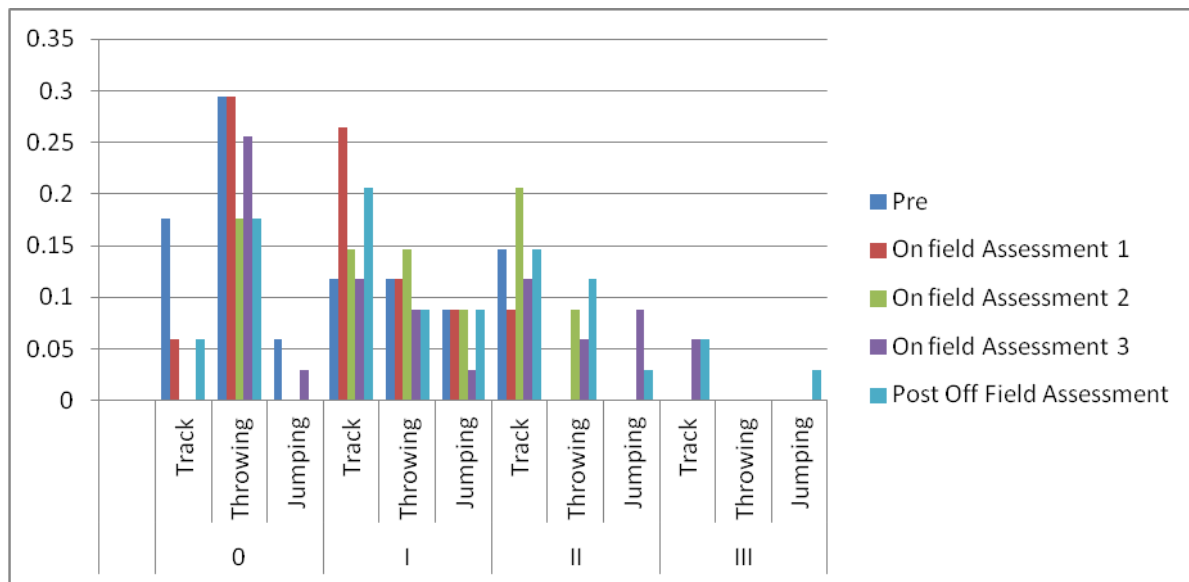


Table 24: Game-wise classification of gradation of Vyāyāmaja Balakṣaya in pre and post assessment

Vyāyāmaja Balakṣaya Grade		Pre Off Field Assessment	On field Assessment 1	On field Assessment 2	On field Assessment 3	Post Off Field Assessment
0	Track	17.64%	5.88%	00	00	5.88%

	Throwing	29.41%	29.41%	17.64%	25.52%	17.64%
	Jumping	5.88%	00	00	2.94%	00
I	Track	11.76%	26.47%	14.70%	11.76%	20.59%
	Throwing	11.76%	11.76%	14.70%	8.82%	8.82%
	Jumping	8.82%	8.82%	8.82%	2.94%	8.82%
II	Track	14.70%	8.82%	20.59%	11.76%	14.70%
	Throwing	00	00	8.82%	5.88%	11.76%
	Jumping	00	00	00	8.82%	2.94%
III	Track	00	00	00	5.88%	5.88%
	Throwing	00	00	00	00	00
	Jumping	00	00	00	00	2.94%

Figure 8: Game-wise classification of gradation of Vyāyāmaja Balakṣaya in pre and post assessment



Observations:

1. Table 22 gives gender classification of sample.
2. Table 23 and 24 presents classification of Vyāyāmaja Balakṣaya symptoms in pre and post assessments of athletes.

Discussion:

Overreaching and overtraining are inevitable obstacle in training & peak performance of athletes. While working on field with athletes & coaches, this came into light that coaches are facing problem with decrements in performance of athletes during competitive period of year than their practice period. While working on this problem, Vyāyāmaja Balakṣaya was the cause ruled out behind this. Athletes were assessed clinically by researcher being Ayurvedic doctor.

Extensive review of literature was done on diagnosis of overtraining (Vyāyāmaja Balakṣaya) & its identification markers in earlier stages. This suggested that there is no availability of assessment scale of overtraining gradation, which can assess it clinically. Hence researcher decided to develop scale for assessment of overtraining based on principles of Vyāyāmaja Balakṣaya in Ayurveda. It that would enable coaches & athletes to diagnose their Vyāyāmaja Balakṣaya at every stage of training.

For this concept of overtraining was thoroughly studied and gradation scale & assessments formats were designed. While doing this time requirements, availability of resources was taken into consideration to make the assessment system user friendly.

Table 23, 24 gives comparative analysis of Vyāyāmaja Balakṣaya gradation & its game wise distribution. Percentage of Vyāyāmaja Balakṣaya in every gradation is suggestive of increasing intensity of training as competitive period reaches.

Table 24 represents game wise distribution of Vyāyāmaja Balakṣaya. This suggests that comparatively high percentage in track events than jumping & throwing events except in on field assessment 1. This suggests that track events need more strenuous training sessions than the other.

Gradation scale includes four grades of overtraining. Grade 0 shows normal symptoms of Ardhashaktī Vyāyāma & increased Vāta Pitta Doṣa due to exercise. This is not harmful. Further grade 1 includes symptoms of vridhatara vat pitta doṣa leading to rasa Kṣaya. This stage is seen in overreaching & symptoms disappears after rest. Grade 2 & 3 are inclusive of further severe symptoms of vrudhatama vāta and pitta doṣa & its effects on māṃsa, Meda, and Asthi & majjā dhātu. In Severe stages of grade 3 will include symptoms of Oja Kṣaya which are not observed in this study. Grade 2 can be recovered after rest & some Ayurvedic medication & pañcakarma therapy. Grade 3 will need complete rest & Ayurvedic medication & pañcakarma therapy.

Thus, this scale is useful to diagnose Vyāyāmaja Balakṣaya gradation and this will be helpful for coaches to adjust the training schedules.

Conclusion of the Study:

Gradation scale developed based on Ayurvedic principles of Vyāyāma is useful to diagnose Vyāyāmaja Balakṣaya in Sports persons.

Recommendations:

From the observations of this study this can be recommended that,

1. Athletes should be regularly assessed on field during competitive season to diagnose & prevent Vyāyāmaja Balakṣaya at its early stage.

2. Sufficient rest should be planned & monitored. The proportion of training & day time rest should be maintained 2:1 in competitive period & athletes should get sleep for at least 7 to 9 hours in night.

Implications:

To Ayurveda:

1. Exploration of new objective assessment tool based on Ayurvedic principles
2. Interdisciplinary research system development

To Sports:

1. Comprehensive module of assessment of Vyāyāmaja Balakṣaya for preventive and curative intervention.
2. This is a user-friendly assessment tool which can be used for early diagnosis of overtraining.

Discussion:

Purpose behind conducting these studies was to understand the present relevance of ancient concepts of balopāsana. Though the application and practices involved in Balopāsana kept on changing with time and need, philosophy behind the concept is eternal. Findings of these studies are enlisted below:

1. Study of application of module of assessment of Trividha Bala:

- Module of assessment of Trividha Bala is practically applicable in the sports field.
- Module of assessment of Bala can diagnose innate sporting ability and tolerance capacity of a person from young age.
- With the help of Module of assessment of Bala it is possible to suggest suitable games for athletes.

2. Study of Module of Balopāsanā:

- This module was applied and studies in various parts including few case studies and a survey study.
- Results of case studies are positive and suggest that Ayurveda Therapies involved in module of Balopāsanā are useful for sports persons for treatment of various sports injuries, rehabilitation, enhancing fitness and recovery and prevention of injuries.
- Effect of Yogic practices was tested through a survey study. Results are suggestive of improvement in overall health of athletes.

3 Study of module of assessment of Vyāyāmaja Balakṣaya :

- Module of assessment of Vyāyāmaja Balakṣaya reveals effects of training on athletes.
- This module is useful in assessment of overreaching and prevention of overtraining in athletes.

From above studies it can be stated that exploration of the concept of Balopāsanā provides practically applicable modules with special relevance to sports medicine. While studying the background of this study it has been observed that there is the need of holistic approach to the practices involved in present sports medicine. From the findings of above studies, it can be stated that concept of Balopāsanā from Sanskrit literature is complementary to physical education to develop holistic fitness of sports persons.

Chapter 5

Summary, Conclusion and Recommendations

Summary:

This study is directed towards the study of the concept of Balopāsanā from Sanskrit literature and evaluate its practical relevance with the present sports medicine (Kṛīḍāvaidyaka). Background of this study presented various contexts of concept of Balopāsanā since ancient time. Present relevance of concept of Balopāsanā is studied with the special reference to sports related fitness. While working in the professional sports field, researcher felt the need of holistic approach towards the fitness of sports persons. With the background of study of the Sanskrit literature researcher felt that concept of Balopāsanā will give holistic approach to the practices of sports medicine field.

According to the guidelines given in objectives, various contexts of the concept of Balopāsanā and its evolution is studied with the help of extensive review of Sanskrit Literature. It included veda, upavedas, Upaniṣads, Ayurveda and yoga. Various contexts and practices involve in Balopāsanā since Vaidika age is discussed. Through extensive review of literature on Vedas, upaveda Ayurveda and Dhanurveda, Upaniṣads, Purāṇas, Yoga and recent research studies relevant with Ayurveda, vyāyāma and physical fitness. It has been observed from this review that Āyurveda literature provides elaboration of the concept of Bala and Vyāyāma.

To understand the practical applicability of this module of Balopāsanā few studies were conducted by researcher. Chapter 4 provides results of three survey studies and few case studies. Survey studies were conducted to understand practical applicability and relevance of modules of assessment of Bala and Vyāyāma Balakṣaya and effects of yoga practices on health of athletes. Case studies were conducted to understand the effects of ayurvedic therapies for various sports injuries and health of athletes. These studies show positive results and it can be stated from these studies that module of Balopāsanā is practically applicable and relevant needs of present Kṛīḍāvaidyaka.

Conclusion:

After summarizing the study, it can be concluded that:

1. Concept of Balopāsanā exists since Vaidika period and its application evolved in various contexts with time and need.

2. Concept of Balopāsanā described in Sanskrit literature involves physical, mental, intellectual, spiritual and social aspects.
3. Exploration of Sanskrit literature reveals the connecting link between Balopāsanā, vyāyāma and Ayurveda.
4. Modules of Balopāsanā based on exploration of literature of Ayurveda, vyāyāma and Bala are relevant to Krīḍāvaidyaka.
5. Modules of Balopāsanā are practically applicable to the sports field with special relevance of Krīḍāvaidyaka.
6. Modules of Balopāsanā are complimentary to physical training to develop holistic fitness.

Recommendations:

Present study is interdisciplinary in nature. It involved the study of Sanskrit literature with special relevance to sports related fitness. Literary part of this study included the exploration of concept of Bala and its relationship with Ayurveda and vyāyāma. Based on this modules of Balopāsanā are developed. These modules were applied on sports personal in various ways to understand its practical applicability with special relevance of present Krīḍāvaidyaka. It can be recommended from present study that:

For Sanskrit:

- Interdisciplinary studies should be conducted in Sanskrit literature.

For Ayurveda, Yoga:

- In depth practical research studies should be planned to understand the efficacy of modules of Balopāsanā.
- Fitness professionals, coaches, Ayurveda doctors, yoga therapists should be educated with concept of Balopāsanā to develop holistic health and fitness.
- Exploration of literature on Balopāsanā should be extended as Krīḍā Ayurveda

For Sports:

- Practices involved in Balopāsanā should applied on athletes from young age
- Sports medicine professionals should be educated with concept of Balopāsanā for developing holistic fitness.

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Appendices

Appendix 1:

Module of Assessment of Bala:

त्रिविध बल परीक्षण			
नांव			
वय/लिंग			
जन्म तारीख		परीक्षण दिनांक	
जन्म स्थान			
१. सहज बल परीक्षण			
१.१ प्रकृति परीक्षण			
परीक्ष्य भाव	वात	पित्त	कफ
सर्वांग	कृश दीर्घाकृती	सुकूमर अवदातगात्र, मध्यम	सारसंहत, उपचित
त्वचा	रुक्ष कृष्ण, परुष स्फटित	उष्ण, आरक्त, शिथिल	गौर, स्निग्ध, श्लक्ष्ण, मृदु
वर्ण	कृष्ण, श्याम	श्यामावदात, गौर, आरक्त	गौर
नेत्र	धूसर, खर	कपिल, पिडगल, तनुअल्पपक्ष्म	रक्तान्त, सुस्निग्ध
	वृत्त, अचारु	हिमप्रिय, आरक्त,	सुव्यक्तपक्ष्मलाक्षः
		सुप्तेकर्णिकारान	शुक्लासितः विशालदीर्घ
केश	रुक्ष, परुष	पिडगकेशोडल्परोमा	घननीलकेशा
	स्फुटित, धूसर		
संधी	चल अनवस्थित	शिथिलमृदुसंधिबंध	गुढ समसुविभक्त
	सततसन्धिगामिनः		सुश्लिष्टसारसंधिबंधन :

गती	लघुचपल, अनवस्थित	तीक्ष्ण चपल	साराधिष्ठित
			अवस्थित मन्दगतयः
असहत्व	शीतासहत्व	उष्ण, क्लेश	सहत्व
मानस	शीघ्रसमारम्भ	शुरो मानी तीक्ष्णपराकमः	अशीघ्रकोध संताप
	क्षोभरागविरागः		
गुण			
प्रकृति विनिश्चय			
गुणांकन			

9.2 सारता परीक्षण

धातु	सारत्व	स्थान	गुण/असारत्व
रस	सुकुमार मृदु	गण्ड, हस्त, पाद	
	अल्प रोम, स्निग्धत्व		
रक्त	आरक्तता,	कर्ण, नेत्र, ओष्ठ, जिह्वा,	
	उष्ण क्लेशासहत्व	पणिपादतल, नख	
मांस	स्थिर मांसोपाचित	अंस, कर्पूर, जानू	
	गूढसंधि		
मेद	विशेषतः स्निग्ध	उदर, स्फिक, हस्त पाद	
	अल्पबल, अक्लेशासहत्व		
अस्थि	संधीस्थूल	पर्वसंधि, हस्त पाद संधि	
	महोत्साहाः		

मज्जा	स्थूल, वृत्त, गुढ संधी	जानु, गुल्फ, कुर्पूर	
	महाबल		
सत्व			
२ कालज बल			
	२.१ सद्य स्वास्थ्य	लक्षणे	गुण
	नाडी: / मि		
	मुत्र		
	मल		
	उदर		
	वेदना		
एकुण गुण			
२.२ गर्भकालीन स्वास्थ्य			
गर्भकालीन	ळो	नाही	
विकृति	मतृज/गर्भ		
प्रसवकालीन	ळो	नाही	
विकृति			
जन्मकाल			
जातज	रचनात्मक		
	सहज व्याधी		
एकुण गुण			
२.३ कुलज वृत्त			गुण
माता पिता स्वास्थ्य	चांगले / वाईट		
खेळ आवड	होय	नाही	
प्रवृत्ती	होय	नाही	

आहार सवयी			
आजार	हो	नाही	
२.४ पुर्वव्याधी वृत्त			
वारंवार आजार	होणारे नाही	कृमी, प्रतिश्याय, श्वास	हृद्रोग अपस्मार
वारंवारता	नाही	ऋतुसंधी ४.५ times	सातत्य
Recovery		3-4 day	
रचनात्मक			
३ युक्तिकृत बल			
३.१ आहार			
	रसप्रीती		
	रससात्म्य		
	आहार सवयी		
	अभ्यवहरण		
	आहार तक्रारी		
५			
३.२ विहार			
	खेळण्याची प्रवृत्ती		
	खेळण्याची सवय		
	किती वेळ		
	चेष्टा सहत्व	क्लेशसहत्व, आतपसहत्व	

	खेलप्रकार आवड		५
४ व्यायामशक्ती परीक्षण			
४.१ व्यायाम प्रतिक्रिया			
		श्वास	
		शूल	
		वंप	
		तृष्णा	
		स्वेद	
		ग्लानी	
		भ्रम	
	४.२ Recovery	१० मिनिटानंतर	
		लक्षणोपशय	

Appendix 2:

Module of Balopāsana:

Module of Balopāsana for Sports Persons	
Dincaryā	
Procedures	Remark
Exercise	Considering sahaja Bala and seasonal recommendation given in Ṛtucaryā,
Abhyāṅga	Recovery measure
Pādābhyāṅga	after exercise before sleep
Pratimarṣa nasya	before, during after exercise, evening
Udvardana	application of herbal medicinal powders
Snāna, Avagāha Śeka	Pool bath/swimming, shower
Anulepana	Application of scents after bath
Āhāra	unctuous, heavy food according to aharavidhi
divāsvāpa	before lunch or 1 hr. after lunch for half duration of training
Nidrā	night sleep for about 8-10 hours
Abstinance	frequency of intercourse should be optimum i.e. once in three days in seasons except Grīṣma where frequency should be once in 15 days
Rasāyana	
Rasāyana	In terms of Āhāra in daily routine and medicines as per prakṛti and need
Ayurveda therapies	
Anuvāsana Basti	in Varsha, Grīṣma season as per training schedule after strenuous exercise before and after competitions for treatment of sports injuries

Yāpan Basti	for recovery after strenuous competitive schedule for treatment of sports injuries
Yoga Practices	
Asana	before/after training as per training requirement can be used as training modality, recovery measures treatment of sports injuries
pranayama	Before, during after exercise,

Appendix 3:

3.1 Modules of gradation of vyāyāmaj Balakshaya:

vyāyāmaj Balakshaya Grade	Symptoms	Interpretation
0	Off field: No any present complains, No history of previous illness & injury.	
	On Field Assessment Symptoms:	
	Svedāgam	Sweating
	Śvasvrudhi	Increased Respiratory rate
	Gātrāṇām Lāghavam	Loosening/Relaxation of Joints
	Hṛdayādyuparodha	Increased Heart rate
I	Śrama	Fatigue
	Śoṣa	Excessive thirst
	Hrudayam tāmyati swalpcēṣṭāsyapi	increased heart rate on less exercise

		stimulus
	Glāni	Sleepiness
	Śabdāsahiṣṇutā	intolerance to noise
	Stambha	Muscular Cramps
II	Klama	Fatigue with subnormal exertion
	Rukṣatā, Paruṣatā	Dryness of skin, joints, muscles
	Sandhisphuṭan	Joint crepitations
	Sandhivedanā	Joint pain
	Kaṭisvapanam	Lower back ache
	Kruśatā	Weight loss
	Gandṣphik śuṣkatā	Dryness / muscle wasting at cheek & buttock region
	Jvara	Fever
	Kasa (śramaj)	Cough
III	Kasa ++	Cough
	Chardi	Vomiting
	Raktapitta	Burning sensation in palms & soles.
		Epistaxis, blood in vomiting, cough, bleeding piles, blood in urine.
	Sandhiśaithilya	Laxity in joints

	Asthitoda	Throbbing pain in bones, joints (Periostitis)
	Khālitya & pālitya	hair fall and hair graying

Appendix 3.1

Modules of Assessment of vyāyāmaj Balakshaya:

OFF FIELD ASSESSMENT FORMAT

Date:

Name:

Age/Sex:

Games:

Duration of Game:

Competition Period:

Present complains:

Previous History of Illness:

General:

With respect to game:

Family History:

General Physical Examination:

Height:

Weight:

Body Type:

Sparshan Pariksha:

Pulse: /min

RS:

CVS:

Udar Parikshan:

Game specific examinations:

Location	Upper limb	Lower limb	Madhya sharer
Snayu (Roukshya, Kathinya, Stambha, Shool,Shaithilya)			
Sandhi (Shotha,Shool,Atopa,Shaithilya, ROM)			

Prashna Pariksha:

Kshudha (Apetite):

Trishna (Thirst):

Mala (Bowel):

Mutra (Bladder):

Nidra (sleep):

Shrama/Klama/Alaska (About fatigue, staleness):

Bibheti/Durmano/Dhyayati/Vyathitendriya (About anxiety during competition):

Comment:

Appendix 3.3

Modules of Assessment of vyāyāmaj Balakshaya:

ON FIELD ASSESSMENT FORMAT

Date/Time:

Name:

Age/ Sex:

Game:

Examination	Pre session	After session
Pulse		1min 2min 3min 4min

<p>Present complains</p> <p>Stambha</p> <p>Shool</p> <p>Pak</p> <p>Kampa</p> <p>Kasa/shwas</p> <p>Trishna</p> <p>Kshudha</p> <p>Bhrama</p> <p>Glan</p> <p>Shrama/klama</p> <p>Dourbalya</p> <p>Epistaxis</p> <p>Alpanidrata</p>		
<p>Local examination Game wise</p> <p>1.Track events</p> <p>Lower limb</p> <p>2.Throwing</p> <p>Hasta/Ansa/Prishtha</p> <p>3.Jumping</p> <p>Pada/prishtha</p>		
<p>Prashna pariksha</p>	<p>How are you?</p> <p>Good/better/best.</p> <p>Do You want to play today?</p>	

	Yes/no Did You sleep sound? Yes/no Did you have dinner yesterday? yes/no Did you have breakfast?	
--	---	--