

INTEGRATING AYURVEDIC PRINCIPLES IN SPORTS MEDICINE: A HOLISTIC APPROACH TO ATHLETIC PERFORMANCE AND INJURY PREVENTION

Review article

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Abstract

Ayurveda, the ancient Indian system of medicine, is one of the oldest medical traditions in the world, offering holistic approaches to health and wellness. Sports medicine is a specialized field that focuses on physical fitness, injury prevention and the management of sports-related conditions. While Ayurveda does not explicitly mention sports medicine as a distinct discipline, its principles can be effectively applied to enhance athletic performance and prevent injuries. By carefully analyzing Ayurvedic texts, we can derive valuable insights into the management of sports-related issues through concepts such as *Dinacharya* (daily regimen), *Ritucharya* (seasonal regimen), *Ahara-Vihara* (diet and lifestyle) and *Oushadha* (herbal formulations). Additionally, through *Dasavidha Pareeksha*, particularly *Prakriti Pareeksha*, Ayurveda can help in selecting suitable sports activities based on an individual's constitution, thereby optimizing performance and reducing the risk of injuries. This review aims to explore hidden references within Ayurveda that contribute to the field of sports medicine and highlight its potential in promoting overall physical and mental well-being in athletes.

Keywords: Ayurveda, Sports Medicine, *Prakriti*, Injury Prevention, Performance Enhancement

Introduction

Sports medicine is a relatively modern medical specialty, and it may seem unlikely that a system as ancient as Ayurveda, with its origins over 5,000 years ago, could have a role in this field. However, a deeper exploration of Ayurvedic principles reveals immense potential in enhancing sports medicine. While classical Ayurvedic texts do not explicitly mention a specialized branch dedicated to sports medicine, they provide valuable insights into injury prevention, physical conditioning and holistic well-being. By applying Ayurvedic principles such as *Prakriti* assessment and *Dasavidha Pareeksha*, athletes can receive personalized guidance on training regimens, diet and lifestyle choices that align with their inherent strengths and vulnerabilities. This proactive approach helps in minimizing sports-related injuries from an early stage and optimizing performance. In Ayurveda, an athlete's training, performance, and recovery strategies are greatly influenced by their *Prakriti* (body constitution). Understanding an athlete's *Prakriti* allows for personalized pre-event, event and post-event preparation to enhance performance, prevent injuries and ensure faster recovery. Ayurvedic texts, particularly those of Acharya Sushruta, provide detailed descriptions of *Vyayama* (exercise), including its indications, limitations, and contraindications. Nutrition or *Ahara Vigyana* is another crucial aspect where Ayurveda can significantly contribute to sports medicine. A well-balanced diet tailored to an athlete's constitution not only enhances endurance and recovery but also prevents imbalances that may lead to fatigue or injuries. Furthermore, Ayurveda's concept of *Bala* (strength) is highly relevant to sports.

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Strength, according to Ayurvedic classics, is not merely physical but also includes mental and immune resilience. The modern challenge of doping in sports stems from the desire for enhanced performance through artificial means. Ayurveda provides natural and sustainable methods to build strength, endurance and immunity without harmful side effects. To integrate Ayurveda into sports medicine effectively, it is essential to interpret and apply its age-old wisdom in the context of modern athletic needs. By doing so, Ayurveda can serve as a powerful tool in injury prevention, performance enhancement, and overall well-being in the world of sports.

Sports Medicine

Sports medicine is a specialized field of medicine that focuses on the prevention, diagnosis, treatment, and rehabilitation of injuries and illnesses related to sports, exercise, and physical activity. It also encompasses performance enhancement, fitness, and overall well-being for athletes and physically active individuals¹. Common sports injuries include concussions, muscle cramps, ACL (anterior cruciate ligament) sprains or tears, ankle sprains, muscle strains, and fractures².

Defining sports medicine is challenging since it is not a single specialty but rather a multidisciplinary field that integrates various medical branches. Its role extends beyond treatment and rehabilitation to include prevention, which is considered the most crucial aspect³. Sports medicine involves multiple specialties, such as cardiology, pulmonology, orthopedic surgery, psychiatry, exercise physiology, biomechanics, and traumatology⁴. The treatment approach varies depending on the type of sport and the nature of the activity.

Selection of Sportspersons

Anyone can become an athlete, but identifying an exceptional sportsperson requires a structured evaluation. In Ayurveda, this is done based on *Dashavidha Pareeksha* (tenfold examination)⁵.

1. Prakriti (Body Constitution): *Prakriti* refers to an individual's inherent physical and mental characteristics, which are genetically determined. It is influenced by sperm (*Shukra*), ovum (*Shonita*), and the condition of the uterus at conception. The dominant *Doshas* at the time of conception, along with maternal diet and lifestyle, further shape an individual's constitution⁶. *Prakriti* significantly impacts physical fitness and athletic performance. Ayurveda classifies individuals into seven types based on *Dosha* predominance—*Vata*, *Pitta*, *Kapha*, and their combinations⁷.

They will remain unchanged until death. Every person is born with this inbuilt and unchangeable *prakriti*. Depending upon the sport event involved, a *vata prakriti* person can be a better athlete than a *kapha prakriti* person. Person specializing in chess is likely to be *Pitta* predominant, as *Pitta Prakriti* individuals possess *Matsarya* (competitiveness) and *Teekshnatha* in *Buddhi* (sharp intellect)⁸.

2. Vikruti Pareeksha sports person should be examined with respect to *Vikruti* also. *Vikruti* represents the pathological manifestations and may be called as pathological disorder or disease. The disease should be examined in terms of strength of *Hetu* (Cause of disease), *Dosha*, *Dooshya*, *Prakriti*, *Desa* (Geographical residence of the patient), *Kala* (Season in which the disease has evolved), *Bala* (Defensive power of the patient) and *Linga Vishesh* (Symptoms)⁹. The strength of the pathology depends upon the strength of the vitiated *Doshas*. Hence, it is of the three types as per the three *Doshas*. Depending upon the severity of the pathological strength of vitiated *Doshas*, the medicine should be administered. The severity of the disease is decided on the strength of the above-mentioned *Dosha*, *Dooshyadi* pathological factors. The disease is said to be severe when there is proportionality of *Dosha*, *Dooshya*, *Prakriti* factors. Whereas, reciprocal nature in above factors cause less severe disease.

Vikruti Pareeksha in Ayurveda is the assessment of an individual's current doshic imbalance, which plays a crucial role in understanding and managing sports injuries. Sports injuries often result from excessive strain, improper movement or trauma, leading to an aggravation of *tridoshas*. The nature of the injury and the underlying doshic imbalance should be determined. Once identified, treatment focuses on herbal remedies, external therapies and dietary modifications to promote faster healing. *Vikruti Pareeksha* not only aids in recovery but also helps prevent recurrence by addressing the root cause and maintaining doshic balance, ensuring optimal performance and longevity in sports.

3. **Sara:** Charaka has described *Sara* examination under the tenfold examination techniques. The term *Sara* means the essence. This is the purest form of *dhatu*. Depending upon the dominance of the *dhatu* individuals are categorized as; *Tvak sara*, *Rakta sara*, *Mamsa sara*, *Medo sara*, *Asthi sara*, *Majja sara*, *Sukra sara* and *Satwa sara*. Among all these forms, the *Asthi* *Sara* individuals exhibit characteristics such as *mahotsaha* (great enthusiasm), *kriyavantha* (active nature), *kleshasaha* (endurance), and *sthira sareera* (stable body), making them well-suited for physical activities¹⁰. Similarly, *Majja* *Sara* individuals tend to have *mridu anga* (soft limbs), *balavantha* (strength), and *sthoola deerga vritha sandhi* (well-developed, large, and strong joints), which contribute to their physical endurance¹¹ and both types are naturally inclined to excel in outdoor sports and physical activities.

4. **Samhananam** (Compactness) refers to a well-built body with strong bones, well-knit joints and firm muscles. It is classified into three types: - *Pravara*, *Madhyama* and *Avara*. *Pravara Samhanana* indicates a well developed symmetrical body, strong joints and well-bound muscles. Such a person has excellent strength. A person who has a moderately symmetrical body, joints with moderate strength and average muscle tone is said to poseess *Madhyama Samhanana*. *Avara Samhanana* is one in which there is weak symmetry, loose joints, poorly bound muscles and as a result, the person possesses low strength. A compact body indicates strength and athletic potential, especially in sports like weightlifting and sprinting.

5. **Pramana (Measurement)** refers to the proportionality of body organs, determining strength, vitality and overall well-being. Proportionality in body organs enhance longevity, *ojas*, happiness, and power, while deviations may lead to imbalances. Athletes often have unique body proportions that provide a mechanical advantage in sports.

6. **Satmya (Suitability & Adaptability)** refers to the body's ability to withstand and adapt to specific diets, activities, and environments. It denotes what is wholesome for an individual even with continuous use. Those accustomed to balanced diets, including all six rasas, develop strength, resilience, and longevity. There are three types of *Satmya*, with *Oka Satmya* (adaptability to specific activities) and *Vyayama Satmya* (adaptability to exercise) being significant. *Oka Satmya* improves with repeated practice, enhancing endurance. *Vyayama Satmya*, as per Sushruta, includes exercises of the body, speech, and mind.¹²

7. **Sattva** represents the mind and governs the body through its connection with the *atma*[soul]¹³. It controls bodily functions by aligning with the self. Based on the dominance of *Sattva*, individuals are categorized into three types: superior (*Pravara*), medium (*Madhya*), and inferior (*Avara*) *Sattva*. Those with a strong *Sattva* exhibit resilience, maintaining stability even during severe afflictions, whether innate or external. To excel in sports, an athlete requires not only physical strength but also mental resilience. Thus, individuals with *Sattva* *Sara* (a predominance of *Sattva*) are better suited for athletic performance.

8. *Ahara Shakti* (Examination for intake of food)

The digestive capacity of an individual can be assessed in two ways: *Abhyavaharana Shakti* (the power of ingestion) and *Jarana Shakti* (the power of digestion)¹⁴. Strength and longevity are directly influenced by diet, which depends on the state of *Agni* (digestive fire) within the body. A person with strong digestive power can withstand intensive therapies and recover quickly from ailments. Those with excellent ingestion and digestion are considered healthy, possessing superior strength, longevity, joy, a well-built physique, sharp mental faculties, well-nourished *Dhatus* (tissues), and strong resilience. For athletes and sports professionals, maintaining good *Ahara Shakti* (digestive capacity) is essential, as proper digestion of adequate nutrition plays a crucial role in enhancing performance and overall well-being.

9. ***Vyayama shakti*** is the capacity to perform physical exercises. There are numerous references related to *Vyayama* in the literature of Āyurveda¹⁵. This description is very vast and expands to all the modern branches of sports science and medicine. Definitions of *Vyayama*, role of *Vyayama* in *Dinacharya* and *Ritucharyā*, benefits of *Vyayama*, procedures indicated before and after *Vyayama* and diet of the person who does *Vyayama* daily are most important references in respects to exercise physiology and sports hygiene. The physical fitness is influenced by many factors such as age, *sara*, *ahara* and mental stability. In Ayurveda details related to exercises is provided. Physical excercises are an important aspect for any sports person.

10. **Vaya**: It is also important factor related to sport medicine. Young person is best for sport because he has a good energy level. As age increases, body start to degenerate hence the physical and mental power of person decreases.

Among these *Dasavidha Pareeksha*, understanding the *Prakriti* of a sportsperson from childhood plays a crucial role in selecting the most suitable sporting event. Proper selection based on *Prakriti* can help shape an athlete for optimal performance. Therefore, a detailed explanation of an athlete's *Prakriti* is essential.

Prakriti

Prakriti in human beings is influenced by both genetic and acquired factors. The genetic constitution is determined by *Shukra* (sperm) and *Shonita* (ovum), while the acquired constitution is shaped by environmental factors such as age, race, heredity, climate, season, and region¹⁶. In Ayurveda, *Prakriti* is a fundamental concept that defines individuality, representing the unique traits of a person based on the specific and permanent composition of *Doshas* established at birth. Since *Prakriti* is unique to each individual, no two people are exactly identical. Anatomical, physiological, and psychological characteristics vary from person to person according to their *Prakriti*.

According to *Ayurveda*, the human constitution is classified into seven body types based on the proportion of the three *doshas*—*Vata*, *Pitta*, and *Kapha*. A perfectly balanced type, with equal proportions of all three, is "samadosha" (*Tridoshic*). However, Charaka noted that most individuals have a dual-*dosha* dominance ("Dwandvaja"), where two *doshas* are prominent, such as *Vata-Pitta*, *Vata-Kapha*, or *Pitta-Kapha*¹⁷. There are also three single-*dosha* types: *Vata*, *Pitta*, and *Kapha*. This classification influences an individual's strengths and weaknesses, including athletic potential. While inherent factors like body type, muscle structure, and physiological capacities play a crucial role in sports performance, training, skill development, and environmental conditions are equally important in shaping an outstanding athlete.

Vata governs movement and speed, while *Kapha* provides strength and stability. Most sports demand both speed and strength for optimal performance. In *Ayurveda*, speed is attributed to *Vata*, whereas strength is associated with *Kapha*. *Kapha* predominance enhances an athlete's biological strength, vigor, and stability, while *Vata* predominance contributes to short bursts of speed and agility. *Kapha-Vata Prakriti* is a combination of both these qualities, offering the ideal balance of strength, stamina, and stability from *Kapha* along with speed and agility from *Vata*, making it well-suited for athletic performance.

Table 1 Features of *Prakriti*¹⁸

Features	<i>Vata</i>	<i>Pitta</i>	<i>Kapha</i>
Body frame	Thin	Medium	Broad
Body built and musculature	Weakly developed	Moderate	Well developed
Skin	Dry and cracked	Soft, thin, with tendency for acne, moles, and freckles	Smooth and firm, clear complexion
Hair	Dry, thin, prone to breaks	Thin, oily, early greying	Thick, smooth and firm
Weight gain	Recalcitrant	Fluctuating	Tendency to obesity
Food and bowel habits	Frequent, variable and irregular	Higer capacity for food and water consumption	Low digestion capacity and stable food habits
Movements and physical activities	Excessive and brisk	Moderate	Less and slow
Tolerance for seasonal wheather	Cold intolerant	Heat intolerant	Tolerant to both heat and cold

Disease resistance and healing capacity	Poor	Good	Excellent
Communication	Talkative	Sharp,incisive communication with analytical abilities	Less vocal with good communication skill
Initiation capabilities	Quick responsive and enthusiastic	Moderate ,upon conviction and understanding	Slow to initiate new things
Memory	Quick at grasping but poor retention	Moderate grasping and retention	Slow grasping but good retention
Ageing	Fast	Moderate	Slow

Somatometry

Somatometry is a fundamental research method in anthropology that involves measuring bodily proportions and sizes in living individuals¹⁹. Somatotyping, a key technique in this field, is used to assess body shape and composition. A somatype represents the quantified description of an individual's current body shape and composition.

- **Ectomorph:**

Characterized by a slim and slender build, ectomorphs typically have fragile bones, weak musculature, and narrow anterodorsal diameters. They often possess sloped shoulders, a relatively short torso, long limbs, a flat and narrow thorax and a rounded arm structure. Their shoulder blades may protrude, and their thighs and arms tend to be weak. Ectomorphs usually have long, delicate fingers and dry, fragile skin. Due to rapid energy expenditure and a low fat-cell count, they struggle to gain muscle mass. Their training should be less intense, with longer rest periods between sets, a high-protein diet, and adequate recovery time²⁰.

- **Endomorph:**

Defined by a rounded, softer appearance, endomorphs have a higher fat-cell count, balanced anterodorsal and frontal diameters, and a waist circumference larger than their thorax. They tend to have a large head, broad face, short neck, and rounded shoulders. Their limbs and fingers are relatively short and weak, while their bones are relatively strong. Endomorphs gain muscle more easily but struggle with fat loss, making them prone to obesity and heart-related conditions if physically inactive²⁰.

- **Mesomorph:**

Recognized for their muscular build and strong skeletal structure, mesomorphs have well-defined muscles, broad shoulders, and a sturdy thorax. They typically have muscular limbs, a firm and flat abdominal wall, a massive pelvis, and good posture. With moderate to fast energy expenditure, they respond well to strength training, rapidly gaining muscle mass²⁰.

Discussion

The *Prakriti* (Ayurveda constitution) represents physical, physiological and psychological characteristic features according to attributes of dominant dosha²¹. For instance, person of *Kapha* constitution possess firmness, compactness of the body, a stable gait and excellent strength. Individuals with *Pitta* constitution have medium body frame, looseness and softness of joints and muscles and moderate strength²² whereas individuals with *Vata* constitution have emaciated tall or dwarf body, inconsistent gait, unstable joints and possess strength in lesser quantity²³. By understanding an individual's *Prakriti* and body type, we can recommend the most suitable sporting event as:

Table 2. Suitable sporting events according to *prakriti*

Prakruthi	Body type	Suitable events
<i>Vata prakruti</i>	Ectomorph	Sprint events, long jump, high jump
<i>Pitha prakruthi</i>	Mesomorph	Cricket, football, gymnastics, chess
<i>Kapha prakruthi</i>	Endomorph	Wrestling, judo, power lifting, throw events

The integration of Ayurvedic principles into sports medicine presents a unique, holistic approach to athletic performance, injury prevention, and recovery. By analyzing classical Ayurvedic texts, it is evident that concepts such as *Prakriti* (individual constitution), *Ahara* (nutrition), *Vyayama* (exercise), and *Bala* (strength) can offer personalized strategies for athletes based on their inherent physiological and psychological traits. The *Dasavidha Pareeksha* (tenfold examination) provides a framework for assessing an athlete's suitability for specific sports, optimizing their training, and reducing injury risk. Unlike conventional sports medicine, which primarily focuses on symptomatic treatment and rehabilitation, *Ayurveda* emphasizes preventive care and natural strengthening of the body through diet, lifestyle modifications, and herbal formulations.

Furthermore, the classification of individuals based on somatometric features and Ayurvedic *Prakriti* helps in selecting the most suitable sports activities, ensuring better endurance and performance. The relevance of Ayurveda in modern sports medicine extends beyond physical health, as its holistic approach nurtures mental resilience, an essential aspect of competitive sports. By integrating *Ayurvedic* wisdom with contemporary sports science, a comprehensive and sustainable model for athletic excellence can be developed, promoting long-term well-being without adverse effects. However, further research and clinical studies are required to establish standardized protocols that can effectively bridge traditional knowledge with modern athletic requirements.

Understanding an athlete's *Prakriti* (body constitution) in *Ayurveda* allows for a personalized approach to diet, daily routine (*Dinacharya*), and seasonal regimen (*Ritucharya*), ultimately enhancing their endurance, performance and mobility.

How *Prakriti*-Based Approach Benefits Athletes

1.Tailored Nutrition – A diet based on *Prakriti* ensures optimal digestion, metabolism, and energy levels. In tailored nutrition, *Vata prakruti* individuals should consume warm, moist, and grounding foods like cooked grains, root vegetables, ghee and dairy products to balance their dry and airy nature. *Pitta prakruti* benefits from cooling, hydrating foods such as fresh fruits, leafy greens, coconut water and mild spices to counteract their heat and acidity. *Kapha prakruti* thrives on light, dry and warming foods like barley, millet, steamed vegetables, and pungent spices to stimulate digestion and prevent sluggishness.

2.Customized Training & Routine – Aligning workouts with their natural tendencies improves stamina and recovery. In customized training, *Vata* types should engage in gentle, grounding exercises like yoga, swimming, and light strength training for 30–45 minutes. *Pitha* types benefit from moderate-intensity activities such as cycling, swimming, or weight training for 40–50 minutes, ensuring they stay cool and hydrated. *Kapha* types require high-intensity workouts like running, and dynamic yoga for 45–60 minutes to boost metabolism and energy levels.

3.Seasonal Adaptations – Adjusting routines per *Ritucharya* prevents seasonal imbalances affecting performance. Seasonal adaptations are crucial, especially for *Pitta* individuals in summer, as they should reduce workout duration, opt for cooling exercises like swimming, train indoors, and use sunscreen or cooling oils like sandalwood to prevent overheating. *Vata* individuals in winter should focus on warm-up exercises, oil massages, and a nourishing diet to maintain body heat, while *Kapha* types should engage in vigorous activities during cold and damp seasons to counteract lethargy.

4.Injury Prevention & Recovery – Understanding their inherent strengths & weaknesses helps prevent overuse injuries.

Prakriti-Based Event Preparation

- Pre-Event: Warming-up techniques, diet, and mental preparation suited to their *Dosha*.
- During Event: Strategies to maintain peak performance with minimal fatigue.
- Post-Event: Recovery methods like *Abhyanga* (oil massage), *Rasayana* (rejuvenation therapy), and herbal formulations for faster healing.

Conclusion

The application of Ayurvedic principles in sports medicine offers a unique and holistic perspective on athletic performance, injury prevention, and overall well-being. By incorporating individualized assessments such as *Prakriti* analysis, *Dasavidha Pareeksha*, and somatometric evaluations, Ayurveda provides a structured approach to selecting suitable sports activities, optimizing training regimens, and enhancing endurance. Unlike conventional sports medicine, which often focuses on symptom-based treatments, Ayurveda emphasizes preventive care through personalized nutrition, lifestyle modifications, and natural therapeutics. The integration of Ayurvedic wisdom with modern sports science has the potential to create a sustainable model for enhancing physical and mental resilience in athletes. However, further scientific validation through clinical studies and research is essential to establish standardized Ayurvedic protocols that can be effectively incorporated into contemporary sports medicine. By bridging ancient wisdom with modern advancements, Ayurveda can contribute significantly to the evolving landscape of sports science, offering a natural and individualized approach to athletic excellence.

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