

# Application of Yogic and Nutritional Aspects to Enhance Sports Performance

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## ABSTRACT

Yoga, the ancient Indian discipline is primarily a spiritual science. Today, yoga finds its utility in many spheres of human life. Sports are no exception to it. Yoga is efficient in delivering the physical, mental and moral fitness required of sports personnel, thus establishing that yoga is a versatile system relevant to a progressive society. In addition, yoga also renders to reinforce the principle of universal oneness among sports persons. Nutritional science, on the other hand gives invaluable information on the right kind of food choices, dietary habits and the necessity of nutritional supplementation for people in the field of sports. This paper attempts to bring out some aspects of yoga and nutrition that have a role in maximizing sports performance.

**Key words-** Yoga, Nutrition, Performance.

To examine yoga practically, the Astanga yoga system of Patanjali and the techniques of Hatha yoga can be used to divide it into two parts - Physical yoga and Non-physical yoga. The two main activities of Physical yoga are

- i. Physical Postures.
- ii. Breathe control (Pranayama).

The two main activities of Non-Physical yoga are

- i. Ethical disciplines (Yama and Niyama)
- ii. Meditative practices (Pratayahara, Dharana, Dhyana and Samadhi).

## Physical Yoga

### 1. Physical Postures (Asana)

Yogic physical exercises (Asana) include Asanas (static postures), Vinyasas (dynamic exercises), Sat kriyas (purification processes) and Mudras (energy-control practices).

Yogic physical postures can increase the Range of joint motion (ROM), increase muscle length and tension (stretch) nadis (nerves and other channels) while maintaining joint stability. Nerve reflexes can be utilized to develop muscular strength throughout ROM and to train muscles to be voluntarily active or relaxed at any length. Synergistic muscle activations can be used to maximize the distance between proximal and distal attachments of muscle and to increase flexibility. Muscle co-activations around the major joints (Bandhas) can help stabilize these joints, assist in generation of energy, and promote circulation.

### 2. Breath control (Pranayama)

Breath-control (Pranayama) is considered the link between the body and the mind, as it can be practiced during both the physical exercises and the meditative practices. Pranayama, which literally means expansion and regulation (Ayama) of the life force in the breath (Prana), develops

internal energy and very efficient breathing which can reduce the amount of oxygen required to do a specific amount of work. Breath-control can be used to increase strength, flexibility and cardiovascular fitness; to reduce blood pressure and to regulate blood chemistry, hormone levels and the nervous system.

### **Non- Physical Yoga – Ethical Disciplines and Meditative practices of Prathyahara, Dharana, Dhyana and Samadhi**

**Yama** - Yama reflects attitude to our environment including people around us.

**Niyama** - Niyama reflects our attitude to ourselves.

**Meditative Practices** - Meditative practices cultivates concentration, will power, feelings of universal oneness.

### **Some important implications of Yoga in enhancing sports performance are-**

#### **1. Optimal Training Load**

There are an optimum number of times to repeat each asana or vinyasa to achieve a maximum training effect.

Intelligent use of hatha yoga vinyasas (dynamic yoga exercises) takes advantage of well established research that shows the optimal training load for dynamic exercise is between 3 rounds and 9 rounds. for e.g.:- a vinyasa style surya namaskara (Salute to the Sun), when it is planned to be hard enough that it can be performed between a minimum of 3 and a maximum of 9 times before you can no longer repeat it (without resting), then the optimal training load has been found and the greatest improvements in dynamic strength can be achieved. <sup>(1)</sup>

#### **2. Training for increased recruitment of motor units**

A person with relatively small muscles may be physically stronger than someone with larger muscles if they are able to recruit (activate or turn on) a number of motor units. (A motor unit is an individual motor nerve and all the muscle fibers it innervates).

Training to increase recruitment of motor units may include the following strategies:

- Training with the opposite limb,

- Mental practice / visualization
- Feed back (auditory, visual, tactile and bio feedback)
- Practice

Yogasanas, Pranayama, Prathyahara and Dharana have a major role to play in the above mentioned strategies.

#### **3. Cardiopulmonary Training**

To improve aerobic capacity you need to exercise at 60% of your maximum heart rate for a period of 15-60 minutes, 3-5 days for week. Aerobic capacity is a measure of person's maximal oxygen uptake i.e. the maximal amount of oxygen capable of being transported to and being utilized by the working muscles, per unit time and per unit body weight. Dynamic yoga vinyasa practice can compete with aerobic exercises in improving maximal oxygen uptake and utilization.

#### **4. Specificity of Training**

The specificity principle simply states that to become better at a particular exercise or skill, you must perform that exercise or skill. This training response has been shown to be highly specific. Traditional strength training techniques often only exercise a muscle, through a limited range of motion (ROM). This can cause a decrease in muscle length and its elastic nature. Yoga postures which activate muscles through full ROM enhance elastic nature of muscles and muscle strength through ROM. Therefore, in sports requiring the engagement and training of various muscles, advanced yoga postures come in handy. <sup>(1)</sup>

#### **5. Reaction Time**

Many reports have demonstrated improved Reaction Time (RT) and respiratory pressures following twelve weeks yoga training that included asanas as well as pranayamas. <sup>(2)</sup> Tejaswini et al (2016) in her experiments concluded Pranayama and meditation improve (a) sensory information processing ability; (b) central integration of learning and memory, and (c) motor function and coordination, visual scanning, mental flexibility, sustained attention, psychomotor speed, and speed of information processing.

These skills improve sustained attention. This probably improves ART (auditory reaction time) and VRT (visual reaction time). This is of applied value in conditions needing faster reactivity such as sports, machine operation, race driving, and specialized surgery. Reaction time, occupies a central place in sports and the above stated research definitely illustrates how sports personal can benefit from yogic practices. <sup>(3)</sup>

#### **6. Relationships and Communication**

Yamas and Niyamas lay a good foundation to build relationships among team members. The esteemed qualities of truthfulness, non possessiveness, physical and mental hygiene and contentment are subtly rolled into none other than yogic teachings. Friendship, compassion and indifference, which are essential attitudes for sports personnel, are very integral to yoga.

#### **7. One pointedness**

Athletes and other sports persons who need to perform at high speeds can benefit immensely from practices like Jyothi Trataka. The practice of keeping one's vision and mind fixed on an object helps them to sustain one's attention for longer periods of time. This is extremely beneficial in any sport. The study conducted by Pushp Latha Rajpooth and Pushpa, on Trataka over anxiety, it was concluded Trataka unlocks the inherent energy of the mind and directs it in the dormant areas of consciousness. Further results of one-pointedness of mind are high will power, improved memory and concentration. <sup>(4)</sup>

#### **8. Relaxation**

Yoga offers numerous relaxation techniques. Yoganidra, mantra meditation and mindfulness, to name a few, are excellent techniques to immediately relax and reduce anxiety and blood pressure, enabling sportsmen to rest, sleep better and recover. Such techniques help to reduce cortisol levels and increase calming hormones.

### **Nutritional Aspects**

Now more than ever, the need for accurate sports nutrition information is increasing. Whether the athlete's performance is recreational or elite, it will be influenced by what he or she eats and drinks. Unfortunately, there is much misinformation regarding a proper diet for physically active persons. In the quest for success, many health- and fitness-conscious persons will try any dietary regimen or nutritional supplement in the hope of reaching a new level of wellness or physical performance.

#### **The 40-30-30 Diet**

Athletes must supposedly eat the perfect ratio of protein, carbohydrate, and fat at each meal and snack to control the hormonal systems and thus reach their maximum performances and ideal weight. This "perfect ratio" consists of 40% carbohydrate, 30% protein, and 30% fat at each meal and snack. Proponents claim that this diet promotes optimal athletic performance and health by altering the production of eicosanoids so that the body makes more "good" eicosanoids than "bad" ones. A balanced production of eicosanoids regulates the local tissue response to stimulatory events.

#### **Should the Athletes Eat Protein During Exercise... and if so, How Much?**

Recent research in athletic performance is looking at the issue of whether protein consumed during exercise, usually in a sport drink or right before or right after exercise, will improve performance or enhance muscle protein synthesis. Typically protein is consumed at meals and snacks, away from activity, leaving a carbohydrate or carbohydrate and electrolyte beverage as the drink of choice during exercise. Several studies have already shown that adding protein or amino acids to a carbohydrate supplement is no more effective for muscle glycogen synthesis than taking the same amount of calories as carbohydrate. Research, however, is suggesting that some benefit for muscle protein synthesis may be gained

from the consumption of small amounts of protein (as little as 6 g) after weight training exercise. <sup>(5)</sup> Newer research suggests that muscle protein synthesis is stimulated even more when a carbohydrate drink is consumed immediately before the weight training exercise. <sup>(6)</sup> In summary, the search continues, but at present there are no good data to support adding protein along with carbohydrate to drinks taken during endurance exercise.

### **Amino acid supplementation**

Protein and amino acid supplementation in the form of powders or pills is not necessary and should be discouraged. Taking large amounts of protein or amino acid supplements can lead to dehydration, hypercalciuria, weight gain and stress on the kidney and liver.

### **Fat**

Fat, is the major, if not most important, fuel for light to moderate intensity exercise. Although fat is a valuable metabolic fuel for muscle activity during longer aerobic exercise and performs many important functions in the body, no attempt should be made to consume more fat over the usual amount unless the athlete is eating less than 15% of calories from fat. <sup>(7)</sup> Very limited evidence supports the concept of consuming a high fat diet for athletes. Though some studies have proposed a positive effect of relatively high fat diets on athletic

### **Micronutrients**

The need for vitamins and minerals in exercise has been reviewed by Haymes and Clarkson (1998) with the consensus that unless an individual is deficient in a given nutrient, supplementation with that nutrient does not have a major effect on performance. Several nutrients are of concern in athletes, including folate, the B vitamins, calcium, and zinc. Because many women athletes are also vegetarians, iron and specifically vitamin B12 may be of additional concern in this subgroup. <sup>(8)</sup> A condition called sports anemia, characterized by decrease in serum ferritin and hemoglobin may be experienced. If true

iron depletion is present, iron supplementation along with Vitamin C is suggested to enhance its absorption.

Vitamins with antioxidant activity, particularly vitamin C, vitamin E, and beta-carotene, neutralize free radicals. The question is whether they enhance recovery from exercise. <sup>(9)</sup> Results from studies in humans show that when 10 mg (33,333 IU) of beta-carotene, 800 IU of vitamin E, and 1000 mg of vitamin C were added to the diets of moderately trained runners for 3 to 4 weeks, levels of creatine phosphokinase and lactic dehydrogenase (both indices of muscle damage) were significantly lower, plasma glutathione did not increase, and recovery after exercise was faster. <sup>(10)</sup> In studies where athletes were deficient in Vitamin C, supplementation improved physical performance, but a thorough analysis of these studies support the general conclusion that Vitamin C supplementation does not increase physical performance capacity in subjects with normal body levels of Vitamin C. Because exercise is a stressor to the body, few nutritionists recommend that active individual may need slightly more Vitamin C than RDA. It is suggested that Vitamin C supplementation may be beneficial for heat acclimation, an idea that merits more research. Recent research shows Vitamin E has a protective effect against exercise induced oxidative injury and the acute immune response changes that exercise produce. Researchers found that supplementation with Vitamin E enhance the immune responses, preventing changes similar to those of infectious disease seen after exercise.

With concern to folic acid, the NHANES (National Health and Nutrition Examination Survey) studies have found that 90% of the study participants fail to ingest the recommended minimum five servings of fruits and vegetables on daily basis. <sup>(11)</sup> A folate supplement to meet the RDA is recommended for such athletes. For few athletes such as wrestlers, gymnasts or rowers who consume low calorie diets for

long periods, a Vitamin B supplement is recommended to meet RDA.

A deficiency of Vitamin B12 could develop in a vegetarian athlete after several years of strict vegan intake. A Vitamin B12 supplement is advisable for such individuals.

### **Ergogenic aids**

Many athletes use nutritional ergogenic aids because they are bombarded with advertisements and testimonials from other athletes and coaches about their effects on performance. Many believe that ergogenic aids will improve their performance and assist in recovery. As in the past, and probably in the future, many of these ergogenic aids are not supported by scientific studies. In fact, many act only as placebos.

### **CONCLUSION**

To sum it up, sports is a demanding activity which requires one to be physically, mentally, emotionally and nutritionally fit. Yoga and nutrition are allied sciences which play an essential role in enhancing performance of sportsmen and women. Yoga has manifold physiological, psychological benefits, some of which are discussed above. Yoga, far from being a mere physical or breathing acrobatics or a demonstration of magic or supernatural powers, is a science of future, with a holistic vision. Nutrition contributes by laying a good dietary foundation, by means of planning a well balanced diet sufficient to cater to the needs of sportsmen and women. By the intelligent application of the above discussed and many more aspects of yoga and nutrition, one can maximize their performance.

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How to cite this article: Sravani K, Ramesh Babu K. Application of yogic and nutritional aspects to enhance sports performance. Int J Health Sci Res. 2019; 9(5):356-360.

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