

**CRITICAL REVIEW ON THE AYURVEDIC PRINCIPLES OF EXERCISE AND SPORTS
MEDICINE**

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ABSTRACT

Ayurveda is one among the oldest traditional medicines, in which we can get significant information about *vyayama* and sports medicine. As there is no direction correlations a lot of close observations and analysis of Ayurvedic *samhitas* we get ideas about sports medicines. Sports medicine has been emerged as an important branch of medicine, which deals with physical fitness, preventions and treatments of sports injuries. In *samhitas* references about *vyayama*, its physiology, indication, contraindications, limits, *vyayama guna*, exercise regimens, injuries like *sandimukta*, *kanda bhagna* and its managements are available. Ayurveda will offer comprehensive and detailed references about genetic endowment, state of training and nutrition of an athlete. Ayurvedic sports medicine can be applied in the level of preventive, curative and rehabilitative therapy. The aim of this article is to understand basics of Ayurvedic sports medicine and its applicability in present era.

KEYWORDS: Sports Medicine, Ayurveda, Vyayama, Bhagna, Exercises.

INTRODUCTION

In recent era sports medicines has been emerged as an important branch of medical science. The contemporary science has recognized it as a separate super specialty branch of medicine. It deals with various phases of sports activities right from the diet, routine practices, life style management of injuries and rehabilitation programs. One may ask the question that traditional medicine Ayurveda can make any contribution in a field of sports medicine. Yes, this article will highlight the areas where Ayurveda can do wonders in the sports medicine.

Vyayama or exercises

Physical exercise is one bodily activity that enhances or maintains physical fitness, overall health and wellness.^[1] Sushruta and Vagbata called it *Suvibhaktata* and *Vibhakta Gatravam* (well build body). Endurance to high amount of stress is indicated by Charaka as *Duhkha Sahishnuta* and by Vagbhata as *Karma Samarthyā*.^[2] i.e. capacity to strain to maximum extent. Physical exercises are generally grouped into three types, depending on the overall effect on body. They are aerobic exercise, anaerobic exercise and flexibility exercises.^[3]

During *vyayama* a series of changes happens in body in which the first one is the development of *ushna guna*. The *ushna* triggers the *chala-guna* of *vyana vayu*.^[4] It increases the heart beats and blood circulations to the muscles. The heart rate also increases up to 180 – 260 beats/min in moderate to severe exercise. It was controlled by increased temperature and vagal withdrawal reflex from proprioceptors in muscles. For continuing exercise body requires constant energy supply, for that *kapha* present in the particular *mamsa dathu* will convert into *oorja* in the presence of *rasa dathvagni*. At the starting of exercise muscles burn glycogen without using oxygen so it is called as anaerobic metabolism. It causes the production of lactic acid in muscles, which leads to burning sensations in the muscles. In respiratory system CO₂ level increases in body signals fast and deep breathing. Initial hypoxic state stimulates juxtaglomerular apparatus to secrete erythropoietin to produce more blood cells. Aerobic exercises are those where energy is obtained by utilizing the nutrients in the presence of oxygen.^[5] Depending on the *chala guna* of muscle exercise is divided into dynamic and static exercises.

According to Acharyas normal the gati of vata will be from shakha to koshta. During vyayama the gati of vata reverses.^[6] That means in severe exercise the systolic pressure increases and the diastolic pressure decreases due to less peripheral resistance.

As the exercise continue the *ushnaguna* increases and send signals to hypothalamus, which results in peripheral vasodilatation and sweating. *Sweda pravarthi* will result in the dehydration and haemo concentration. During first stage of *vyayama* body use the *kapha* in the *mamsa*, then next stage it uses the most reachable one ie: *kapha* of *rasa* and *raktha dhatu* and finally use the *kapha* of *medas*. Muscle burns all the muscle glycogen within 3-5 minutes, after that liver glycogens are being used for 20 minutes and then starts burning body fat. During the period of exercise *vatapitta dosha* will increase and *kapha dosha* decreases. The *veerya* (stamina) and *bala* (strength) of the body is provided by *sukra dathua*. Other *dathus* like *mamsa* and *medas* give *bala* and *dridatha* (firmness), *rasa* and *Rakta dathu* give *poshan* (nourishment), *majja* and *asthi* give *sneha* (lubrication) and *stiratha* (stability). 30 to 80 % of energy for the physical activity is supplied by free fatty acids and intra muscular triglycerides.

Kreedacharya vidhi

Kreedacharya vidhi describes the various practices that are *pathya* and *apathy* to sports persons. *Vyayama shakti* is the visible form of the sarira *bala*. The foods which contain *snigdha*, *picchila* and *guru guna* will increase the *bala* of the body. In *annapanas* avoid items which cause increase in *vatapittadosha* and alcohol, which leads to *vatapitta vardhana* and in turn leads to risk of injury or less performance. The list of wholesome items in food would be red *Sali* rice among cereals, green gram among pulses, rock salt among salts, *Jeevanti* among herbs, meat of deer among animal meats, meat of quail among birds, meat of Iguana among the animals living in holes, *Rohita* among fish, *Amalaka*, water, cow's milk among milk, cow's ghee among fats, sesame oil among vegetable oils and honey are prescribed.

According to Ayurveda right time for the sport depends on the biological rhythm, the best time for *vyayama* will be between 6 to 10 a.m. The best season to do *Vyayama* is during *sheeta* and *vasanta ritu*. It is contra indicated in *greeshma*, *varsha* and *pravrut ritu*.

Before starting *vyayama*, *abhyanga* (massage) should be done to decrease *vata vardhana*, skin protection and increase stamina. Also *sneha vasti* can be done daily to decrease *rookshata*. After *vyayama* whole body can be massaged mildly and can drink *ksheera* which will remove exhaustion. One can do *pratimarsha nasya* after physical exercise to remove tiredness.

Acharya Susruta explain *udvartana*,^[7] upward and downward movements with oils and dry powders, with the help of palm of hand and *udgharshana* more forceful

rubbing creating greater friction generally with dry powders. He advises *udgharshana* with *Phenaka* (*Samudraphena*) to strength-then the calf and thigh muscles. Acharya Vagbhata explains *utsadana* (gentle rubbing with oils), *mardana* & *unmardana* (downward movements). Other massaging techniques in Ayurveda are *samvahana* (gentle tingling oil massage), *padaghata* (massage with feet), *peedana*, *avapeedana* (kneading with knuckles and fingers), *pari-peedana* (circular kneading), *unvestana* & *upavesthana* (massage applied to the limbs), *udvestana* (upward movement) and *upavestana* (opposite), *latavestana* (spiral friction), *manthana* (muscle rolling), *sandhi chalalana* (Joint movements), *samdanshika* (pulling), *harshana* (vibration), *praharshana* (percussion), *chedyam* (hacking), *tadana* (slapping), *samputaka* (boxing), *vadyan* (tapping), *asphalana* (clapping), *marjana* (Sweeping) etc. These massages can be used according to the specific conditions so that it will results in quick relief.

According to Ayurveda physical exercise should be done till the half of the strength (*ardha shakthi*). According to Acharya Susruta *ardha shakthi*,^[8] is the time when he starts taking air through mouth. Exercise should not be done in *vatapitta* condition, pregnancy, children, old peoples, and in diseases like indigestion, fever, skin diseases, urinary diseases, fistula, ascitis and after all *panchakarmas*.

Sports medicine

The concept of sports medicine as a distinct entity in health care appeared only since the late 20th century. In early days sports medicine was predominantly an orthopedic subspecialty, later many specialties were merge together and form American Medical Society for Sports Medicine (AMSSM) in 1991. Sports medicine team consist of medical faculties like orthopedician, surgeons and paramedical faculties like exercise physiologist, physical therapists. Sports medicine,^[9] teams are able to evaluate medical patient's co-morbidities, perform excise testing and provide an exercise prescription, together with a motivational program and exercise classes.

In sports medicines Ayurveda can do wonders in prevention of injury, injury management and rehabilitation. Prevention of sports injuries by pre-sports training, *dinacharya*, *ritucharya* and specific *vyayama charyas*. Here various aspects of human body, its behavior and psychological changes can be accessed through *sara*, *bala* and *prakrithi* of individuals.^[10] Secondly Ayurveda have better management in minor sports injuries like close simple fractures, sprain, strains and soft tissue injuries. Ayurveda has effective remedies that can either be used as a main therapy or as a supportive therapy in numerous orthopedic problems associated with sports. One of the main therapies is *marma* i.e. manipulation therapy. This is same as acupressure and helps in the management

of pain. Post injury management by Ayurvedic preparation, *yoga, pranayama* and *Panchakarma* also shows fast recovery to normalcy. Ayurveda can improve the physical and psychic quality of athletes by following good diet, *dinacharya, ritucharya, sadvritta, pranayama, yoga* and *rasayanas*.

In sports, the selection of the athletes can be done using Ayurvedic criteria like *ashtasthana pareeksha*,^[11] including *sara, bala, prakruti* etc. According to Acharya Charaka examination of *sara* helps to identify suitable physic like *asthi sara* (strong and firm body), *satva sara* (highly enthusiastic) *mamsa sara, majja sara and sukra sara* (good strength). The highly unsuitable *sara* are *tvak, Rakta* and *medosara* as they all are *sukumaras*. *Bala* is tested base on the strength of body, sense organs, body tolerance and digestive power.

Treatment of sports injuries and rehabilitation is a challenging field as it deals with career of an athlete. In the last ten years Ayurvedic sports medicine has validated positive results over 800 national athletes. Ayurvedic sports medicines comprises of medications, *marma* therapy (manipulation of vital points), massage, *Panchakarma, snehana* (oilation), *swedana* (sweating), bandaging etc. Along with Ayurvedic techniques modern methodologies like physiotherapy, periodisation, biomechanics, sports nutrition etc can be incorporated to get quick relief. Treatment modalities for athlete should be very specific by considering the nature of injury related to specific sports. These herbal preparations help in increasing stamina, preventing injuries, treatment and rehabilitation of injures. They also help in speeding up the process of healing, even after a surgery.

Sports injury as per Ayurveda concepts as *bhagna* (fractures & dislocations), *sandhimukta* (dislocation & subluxation), *sadyovrana* (acute wounds), *snayugata vaata, kandaragatvata* (tendon & ligament injury), *mamsagatvata* (sprain & fatigue syndrome), *vrana* (wounds), *vranashotha* (inflammatory conditions). The chief aim of internal medication is to boost up tissue healing, alleviate pain and to strengthen the injured part. The external therapies aims to alleviate pain, strengthens joints and to improve function. The chief aim of *lepana / alepa / upanaha* is to alleviate pain and promote tissue healing. *Kati vasti* is very effective in low back pain, muscular pain and fatigue syndrome. Acharya Susruta mentioned 14 types of *vrana bandhanas* which helps in quick healing and protection. Para Surgical Procedures including *agnikarma* (direct heat application) and *raktamokshana* (bloodletting) helps in reducing inflammation alleviate pain and promote healing.

The general principles of fracture and soft tissue injury managements are RICE protocol.^[12] R – rest done for protection, I- ice for reducing swelling and pain, C- compression bandages for decreasing swelling and E- elevate above heart level to reduce bleeding and swelling. Dislocation is managed by reduction,

immobilization, bandaging and rehabilitation. In ligament injuries grade 1 and 2 RICE techniques along with murivena bandage can be applied for 6 weeks. In grade 3 surgical repairs is the only option. Acharyas mentioned fracture management done using manipulations like *anchana* (traction), *pidanam* (reduction), *sanksepa* (immobilization) and *bandhana* (bandhana)^[13] In Ayurveda traction done like *chakrayoga* in *urvasthi bhagna*, immobilization done using *kusha*, barks of *madhuka, udumbara* etc. *kapada shayana* is a special type of retention indicated in lower limb, pelvic and vertebral fractures. Fractured one has to lie in a wooden box with 5 keelas (pegs), ropes are fasten tightly for immobilization.

Susruta has indicated many herbs like *manjistha* (*Rubia cardifolia*), *yasthimadhu* (*Glycyrrhiza glabra*), *raktachandana* (*Pterocarpus santalinus*), *asthishruankhala* (*Cissus quadrangularis*), *guggulu* (*Commiphora mukul*) which will help in acceleration of callus formation. The drugs in the *sandhaneeya* group mentioned by Charaka also help in healing.

DISCUSSION

In Ayurveda though we do not find readymade management for sports injury, but close observation with correct perception of implied meaning of ancient words of wisdom shows enormous possibilities in sport injury. As all the sports injuries are *aganthuja vyadhi* and it affects the *madhyama roga marga* the treatment will be difficult (*krichra sadhya*).

The challenges faced by a modern sports person are not just musculo-skeletal but it also includes physical, physiological psychological social, economical, environmental stresses. Ayurveda can effectively work towards physical, stress relieving and in developing concentration. Ayurveda has a holistic approach in sports to maintain inner balance with strong body and immune system. *Vyayamasakthi* is the capacity to perform physical exercise. The physical fitness is influenced by many factors such as age, *sara, ahara*, mental stability so on. After a healthy training session, sport normally makes you feel better and more energetic than before.

During exercise the gastric acid secretion reduces significantly, so *vyayama* done soon after taking *snigdha ahara* leads to *ama*. As the *vata* move from *koshta* to *shaka* in *vyayama ama* will move to *shakas* and produce *amavata*. That's why *vyayama* should be avoided soon after food. *Vyayama* should be done in all season except in *varsha* due to *klinna bhooyishta* and *agni mandhya*, in *greeshma ritu* due to intense heat, *kapha kshaya* and *vata vardhana*. This will reduce the *bala* of person.

The three primary factors that influence athletic performance are genetic endowment, state of training and nutrition. Genetic endowment can be accessed through analyzing the *prakruti* of person. *Vata* should consider low intensity sports, *kapha* can tolerate

moderate and *piyya* can do vigorous sports activities. Food should be taken according to eight factors such as nature of food, processing of food, combination, quantity, place, time, dietetic rules and constitution. These Ayurvedic principles will help to select and develop a healthy athletic body.

According to Charaka, *vasa* is specifically indicated for people who are doing *vyayama* daily. It can be also indicated in the treatment of *vyayama karshita* (exhausted by exercise) and the fractured one. *Vasa* are nothing but the intra muscular triglycerides which triggers construction of muscle cell membrane. That's why it is indicated in *vyayama karshita*. Acharyas also mentioned the use of *majjapana* to increase the bone strength. This drinking of *majja* can be correlated to transplanted bone marrow to speeds up delayed fracture union in combination with zespul fixations.

The physical and mental stamina of sportsman indicate perfect health with *tridosha* and *saptadhatu* in their normal condition. However the *rasayana* therapy for *dhatupachaya* (proper development of dathu) and *balavridhhi* (Strength) naturally is most suitable and can be adopted during the training programme. For enhancing the physical powers of a person, Ayurveda offers herbal supplement support. Ayurvedic herbal formulas are said to have components that can enhance the performance level. These were widely used in ancient times by warriors to enhance their performance during war. Some of these are *Brimhaneeya dasaimani* (Muscle builder), *Jeevaneeya Dasaimani* (Vitaliser) *Balakara Dasaimani* (Promotes strength) and *Sramahara dasaimani* (Promotes cheer). These formulas are non-steroidal and probably act by increasing the secretion of the biological hormones and enzymes in the body.

A relationship between modern sports medicine practitioners and Ayurvedic practitioners should be initiated to develop a more natural and effective way of approaching sports medicine. A research study was done on two groups of healthy sports men using *balya dashaimani* and placebo.^[14] The group with the drug *balya dashaimani* has shown highly significant results. Research in the field of micro-biology has revealed a group of naturally occurring substances many plants classified as biological-steroids that have actions very similar to steroids without any side-effects. eg: *Draksha*, *Dadima*, *Parooshaka*, *Iksu*, *Yava*, *Shastika*, *Phalgu*. The *rasayana*,^[15] like *amalaki* has shown to aid natural holistic immune boosters as well as muscle anabolic properties. It also helps to destroy the cell destroying free radicles produced during exercise and sports. The professional athletes need rejuvenating food to reduce damage and undergo Panchakarma therapy to purify the body.

Acharya Charaka advises the massage after exercises which would enable the body to endure extreme strain and reduces fatigue. Modern medical science too agrees upon the advantage of massage. Dr. Peter N. Sparryn (1983) says it may help to drain inflammatory exudates form injuries in the early stages. Connective tissue massage (Ebner 1977) is useful in the management of soft tissue lesions because it helps in reabsorption of haematoma and stimulates blood flow in the affected parts. A gentle massage with oil helps to reduce the buldup of latic acid, lactate, which produce delayed onset muscle soreness (DOMS).

The *vyayama* can be used as a method to maintain health and to treat diseases. Ayurveda already mentioned it as the treatment for *santharpanodha vyadhi* (over nourishment diseases). In Ayurvedic samhitas disease like *urustambha* (frozen thigh) swimming against current mentioned, which is a resistance exercise. Mostly resistance exercises are anaerobic but these exercises are aerobics. Acharya vagbhata mentioned walking long distance, digging well is the treatment for obesity and diabetes. In both condition it is a continuous non resistive sports called aerobics.

Use of Ayurvedic medicines external and internal found to be best in the healing of injuries, prevent edema, stiffness and muscle wasting when compared to modern treatments. *Ayurveda* can creates miracles in various kinds of injuries like tennis elbow, heel pain, plantar Fasciitis, heal spur, highland's syndrome, Achilles tendinitis, tenosynovitis, groin injury, long Lasting patellar tendinitis, supra spinatus tendinitis with shorter duration of time compared to modern medicine. These all are *sira*, *snayu*, *sandhi gatavyadhi*, and the method of management is oilation, bandage and branding. Many surgical conditions like meniscal tear, rotator cuff tear, ligament tear, condylar fracture, Patellar dislocation, recurrent shoulder dislocation, back pain and neck pain due to inter vertebral disc disease can be treated and recovered in shorter span of time by integrated method. Degenerative diseases like osteoarthritis, per arthritis affecting the old age can be successful brought back to normal stage and patient can move without pain safely in low treatment cost.

CONCLUSION

In the present era Ayurvedic sports medicine is well recognized and accepted branch of medicine. For an athlete performance enhancement, attaining physical and mental fitness can be achieved through Ayurvedic medicine. Athletic body needs both internal and external purification through Ayurvedic approach to maintain the health. Ayurveda can handle both acute and chronic lesions of musculo skeletal system except major surgical conditions. The herbal treatment will speeds up the tissue regeneration and enable the athlete to go back to sports quickly. In fact the integrated approach of modern technology and Ayurvedic measures in fitness as well as

therapeutical level would be a revolutionary approach in sports medicine.

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