



## PREVENTION OF MUSCULOSKELETAL INJURIES (MSI) BY THE CONCEPT OF SARATA: A BEAM OF LIGHT IN SPORTS MEDICINE

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### ABSTRACT:

Participation of people in sports has increased since last decade which resulted in increased incidence of sports injuries in athletes. 80% sports injuries are of the musculoskeletal system. Treatment of sports injuries depends on the type of injury; minor ones are usually treated at home by R-I-C-E (resting, icing, compressing, and elevating). But for more serious injuries, physiotherapy for rehabilitation, braces and sometimes may need surgery. Hence prevention of these is the key to avoid permanent damage. Concept of *Dhatu Sarata* has an indirect solution for this. If *Dhatu*s are not in its proper state (*asar dhatu*), they will definitely hamper the strength of the body. This strength is nothing but *Dhatu bala*. If *Dhatu bala* is good (*sar dhatu*), then it will provide more strength thereby avoiding the injuries. In sports medicine, *mansa*, *asthi* and *majja dhatu* play a vital role similarly, *Upadhatu* such as; *Snayu* and *Kandara* also get injured. Individuals having good quality of *mamsa*, *asthi* and *majja dhatu* have the good physical strength and perform well in any sport. Individuals with *asar dhatu*s can be treated to enhance their strength with *adravya* and *dravya chikitsa* as supplements. *Abhyanga*, *udavartana*, *samvahana*, *vyayam*, proper techniques of exercise like *ardha shakti vyayama*, *padtran dharanam* are helpful in increasing the individual's sports stamina and also prevent getting injured. *Dravyas* like *rasayan dravya*, drugs of *jeevaniya gana*, *bruhaniya gana*, *shramhara gana* increase individual vitalizing capacity, boost muscles and strength and also prevent injuries from sport.

**Keywords:** *Adravya* and *dravya chikitsa*, *Dhatu sarata*, Musculoskeletal injury, *Rasayana*, Sports medicine

## INTRODUCTION-

During last decade, children and adolescents have been actively participating in sports at very early ages. This trend has partly contributed to the patterns of injuries seen in young athletes, and especially in recent years, injuries previously seen in senior athletes are being seen in young athletes<sup>[1]</sup>.

Studies regarding the epidemiology of sports injuries are often difficult to state as the definition of a sport-related injury varies across studies <sup>[2-8]</sup>. Though, most definitions include one or more of the following descriptions: time loss from practice or game, decreased level of activity, and the need for medical attention.

Sports injuries are divided into two broad categories- acute and chronic. Acute injuries occur suddenly, such as when a person falls, receives a blow, or twists a joint. Examples are sprains, strains, concussions, fractures and dislocations. Chronic injuries usually result from excessive use of one part of the body. They grow and develop gradually over time. Some common chronic injuries are shin splints, tennis elbow, runners knee, Achilles tendinitis and stress fractures<sup>[9]</sup>.

80% of sports injuries are of the musculoskeletal system<sup>[1]</sup>. The musculoskeletal system is the network of muscles, tendons, ligaments, bones, and other

tissues that provides the body with stability and enables movement.

Treatment of sports injuries depends on the type of injury, minor ones are usually treated at home by (R-I-C-E) resting, icing, compressing, and elevating the injured part of the body<sup>[10]</sup>. But for more serious injuries, a course of physiotherapy for rehabilitation, fit for a cast, splint, or braces is needed. In some cases, may need surgery. Treating MSI is quite long- term therapy, and sometimes can't be treated completely. Hence, prevention by some preventive modalities is the key to avoiding permanent damage.

Ayurveda, the science of life, gives curative and preventive approaches to the same. Sports medicine is one of the emerging concepts of Ayurveda. It deals with the maintenance of the good physical and mental status of sports persons. The ancient text of Ayurveda doesn't have a direct reference of sports medicine but has stated various aspects which may be correlated with sports injuries and their treatment i.e. Sports medicine.

Ancient science has given the method to analyse the strength of the individual (*dhatu sara parikshan*) so that person's strength can be analysed and lifestyle changes can be done to increase his physical strength and stamina<sup>[11]</sup>. If *dhatu*s are of good quality (*sar dhatu*) they provide more strength to body

and if they are in *heen sar* form they will hamper the strength of body<sup>[12]</sup>. To improve the quality of *heen sara dhatus* Ayurveda has given two types of remedies- *dravya chikitsa* and *adravya chikitsa*<sup>[13]</sup>. *Dravya chikitsa* includes various *aushadhi ganas* like *brihaniya*, *jivaneeya kashaya*, *rasayana sevan* etc to enhance the stamina and built of the person<sup>[14]</sup>. *Marma* therapies and natural medicine are also given to empower the strength of these *dhatus* and *updhatus*.

Some procedures like *abhyanga*, *udavartana*, *samvahana*, *vyayama*, *padatran dharanam* and *nasya* of daily regimen can also improve the individual's muscle brawn<sup>[15-18]</sup>.

#### **AIMS AND OBJECTIVES-**

1. To review sports medicine according to Ayurvedic point of view.
2. To study and review the concept of *sarata*.
3. To study and find preventive solutions for musculoskeletal sports injuries given in ayurvedic literature.

#### **MATERIALS AND METHODS-**

In this critical literary review study, various Ayurvedic Samhitas, Modern Books, and Journals were studied and reviewed in the perspective of exploring the preventive modalities given for musculoskeletal injuries. Ayurvedic Samhitas were reviewed in the context of preventive methods for *abhighataj vran*, *ativyayamjanya vyadhis* etc. As per

reference from Charaka Samhita, various solutions given for analysing and improving *dhatu bala* are reviewed. Modern books for a better understanding of musculoskeletal injuries are explored.

#### **DISCUSSION-**

##### **Concept of Sarata-**

Ayurveda has the concept of *Dhatu Sarata* (Tissue excellence). It determines the *bala* (strength) of a person. According to Ayurveda, our body is made up of *Doshas*, *Dhatus* and *Malas*, they are the roots of our body. *Doshas* are structural and functional units of the human body, *Malas* are to keep the body healthy and clean and *Dhatus* give support and strength to our body. The *Bala* of any individual can be assessed by examining the *dhatu saarata* of the person<sup>[19]</sup>. There are 8 types of *Sara*<sup>[20]</sup>.

##### **Importance of Sara Parikshan-**

*Sar parikshan* primarily states the strength of a person. Acharya Chakrapani described *sara* as '*vishuddhataro dhatu*'<sup>[21]</sup>. It basically means the essence of all *Dhatus*. Acharya Charaka has explained eight types of *sarata*, each one characterized by both physical and psychological parameters<sup>[22]</sup>. These help physicians in deciding the *bala* of a person<sup>[23]</sup>. Person should not be captivated to decide if any person is strong or weak from his large or small body structure or appearance. Small,

lean and thin persons seem to be strong enough. It is just like “*Pippilika Bhara Harnvat Siddhi*” which means that small-looking ants can carry much more weight than its own weight<sup>[24]</sup>.

#### **Types of Sara-**

Acharya Sushruta has classified Sara into eight types and described the characters of each one. Sushruta Samhita also described that a physician can treat a patient more effectively if he assesses the life expectancy of the patient on the basis of the criteria of measurement of each body part and *Sara Pariksha*<sup>[25]</sup> Acharya Kashyap has emphasized nine types of Sara with *Oja Sara* as an additional kind of Sara<sup>[26]</sup> whereas, Acharya Vagbhata has only given the types of Sara without describing their characteristics in detail<sup>[27-28]</sup>.

#### **Interpretation of Sarata-**

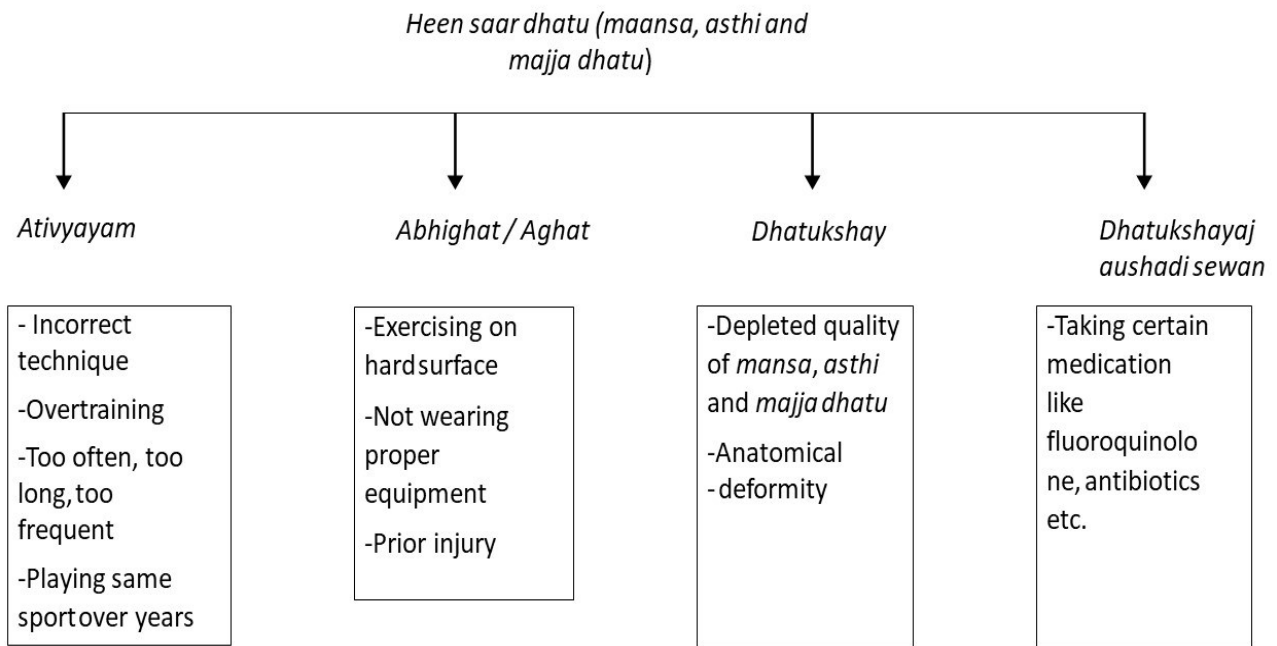
*Sara* has also been classified into *Pravara*, *Madhyama* and *Avara* types. Persons having *sarva sara* have great power, are blissful, can tolerate pressure/good endurance, firm and well-built body, correct gait, are always inclined to welfare activities, have unctuous and deep voice, power have good self-confidence in initiating any work, the delayed ageing process, less affected by diseases and have a large number of children with similar traits and long life. The persons having

qualities opposite to the above are *asara* persons, whereas *madhyam sara* persons have some (3–4) qualities of *pravara sara*<sup>[29]</sup>.

In sports medicine, *Mansa* and *Asthi Dhatu* play a vital role similarly *Upadhatu* such as; *Snayu* and *Kandara* are also involved in sports injury. Prominent joints such as; *Gulfa* (ankle), *Janu* (knee joint), *Aratni* (elbow), *Jatru* (sternoscapular joint), and *manibandha* (wrist) are vulnerable to sports injury<sup>[30]</sup>. There are some risk factors for sports injuries like not using the correct exercise techniques, having the poor muscle build (*heen sarta*), *Overtraining*- either by training too often, too frequently, or for too long (*ativyayam*), having depleted quality and quantity of *mamsa* and *asthi* and *majja dhaatu*. It also includes changing the intensity of physical activity too quickly, playing the same sport year-round, running or jumping on hard surfaces, wearing shoes that do not have enough support, not wearing the proper equipment, having had a prior injury, having some anatomical features specific to each joint or poor flexibility, taking certain medications, such as *fluoroquinolones*, a class of antibiotics linked to *tendinitis* and *tendon rupture* etc.

*Sara* is the *Vishuddhatara svarupa* (wholesome form) of that particular *Dhatu*. So that, it will be able to perform its normal functions having good strength. If *Dhatu*s are not in its proper

state, they will definitely hamper the strength of a particular organ or of the whole body.



**Fig. 1 showing causes of sports injuries.**

This strength is nothing but Dhatu bala. If Dhatu bala is good, then it will provide more strength and injuries to them will be avoided. To assess this *Dhatu bala*, acharyas have given a tool i.e. to examine *dhatu sarata*.

**Application of *Dhatu Sarata* in sportspersons-**

*Dhatu sarata* estimation must be done in sportspersons-

1. to assess strength/ immunity ( *bala- man vishesh dnyanartha*)
2. to give proper treatment to *asara dhatu*.
3. prior to *rasayana chikitsa* to increase sports stamina.

4. to maintain *uttam sarata* of particular *dhatu* with proper food (*ahara*) and regimen (*vihara*)<sup>[31]</sup>.

**Clinical presentation of *mamsa, asthi* and *majja sarata* person-**

***Mamsa Sara-***

Individuals having the excellence of the *Mamsa Dhatu* are characterized by stability, heaviness, beautiful appearance and have more tolerance to physical and mental strain.

**Table no. 1- Showing clinical features of *mamsa, asthi* and *majja Sarata*<sup>[23]</sup>**

Sr. no	Sarata	Charaka	Sushruta
1	Mamsa	<p><b>Physical-</b> Temples, forehead, nape, eyes, cheek, jaws, neck, shoulders, abdomen, axillae, chest, hands, feet and joints are equipped with firm heavy and good-looking muscles</p> <p><b>Mental-</b> Forbearance, restraint, lack of greed, wealth, learning, happiness, simplicity, health, strength and longevity</p>	Body without any depression, the bony joints are concealed and the muscles are well developed
2	Asthi	<p><b>Physical-</b> Heels, ankles, knees, elbows, collar bones, chin, head and joints Prominent</p> <p>Bones, nails and teeth Large</p> <p><b>Mental-</b> Enthusiastic, active, enduring, having a strong and firm body as well as longevity</p>	Big head and shoulders and firm teeth, jaw, bone and nails
3	Majja	<p><b>Physical-</b> Soft organs, strong, unctuous complexion and sweet voice, prominent, long and rounded joints</p> <p><b>Mental-</b> Long-lived, strong and endowed with learning, wealth, understanding, progeny and respect</p>	Person is not lean, has superior strength, melodious and resonant voice, auspicious features and big eyes.

***Asthi sara-***

*Asthi sara* Individuals are very enthusiastic and active and are endowed with strong and firm bodies as well as longevity. *Asthi sara* person is known to possess a big head and shoulders and big teeth, big jaws, bones and nails. As

trees are supported by an inner hard core inside their trunk, the body is supported and kept erect by the firm bones. Muscles, veins, (*sira*) and ligaments(*snayu*) are the most important structures for holding the bones in place and avoiding collapsing of the body.

*Asthi* has a predominance of *pruthvi mahabhuta* which ultimately provides stability. Due to all these qualities, it provides physical strength. *Vat dosha* and *asthi dhatu* have a co relation<sup>[32]</sup>. Enthusiasm and activeness are the major functions of *vat dosha* in the state of equilibrium. Therefore, *Asthi sara* individuals have all the qualities described above.

Ayurveda has given different *ganas* like *brihaniya*, *jeevaniya gana* having various *aushadhi dravyas* which work on different systems of the body.

**Table no. 2 - Showing *dravya ganas* and their effect for improving performance<sup>[33]</sup>**

Sr. no	Drugs category	Effect
1.	<i>Brimhaneeya dasaimani</i>	boosts muscles
2.	<i>Jeevaneeya Dasaimani</i>	Vitaliser
3.	<i>Balakara Dasaimani</i>	promotes strength

These categories of drugs also improve the performance level of a sports person. Similarly, *Draksha*, *Barbara*, *Priyala*, *Parooshaka*, *Iksu*, *Yava*, *Shastika*, *Dadima*, *Jeevaka*, *Phalgu*, *Rishabhaka*, *Meda*, *Mahameda*, *Kakoli*, *Ksheerakakoli*, *Jeevanti*, *Mashaparni* and *Mudgaparna* act as performance enhancing agents thus may be

used as nutritional supplements and in the form of diet in sport medicine<sup>[34-38]</sup>. These drugs are prominently *madhur rasatmak*, *madhur vipak* and are *sheet veeryatmak*. They are commonly *guru*, *snigdha* and *bruhaniya* in nature while *yava* and *mudgaparni* are *ruksha*. They are mostly from *jeevaniya gana* while *kshirkakoli* is from *angamard prashaman* and *draksha* and *parushak* belongs to *shramahara*<sup>[39]</sup>.

*Rasayana* due to their rejuvenating and strengthening effect may also be used as sports medicine to enhance physical performance and muscle strength. Specifically, *rasayana dravya* such as *vacha* and *raupyabahsama* act on *majjavaha strotas* while *abha* offers beneficial effects for *Asthivaha strotas*. *Rasayana* therapy promotes stamina and methods like *Kutipravesha* boosts physical power. *Rasayana* therapy nourishes *dhatu*s thus helping to build a strong physique, it promotes general health and enhances resistance to injury<sup>[40]</sup>.

*Abhyanga* is one of the important massage therapies which promotes health but also prevents and cures sports injuries. It nourishes the body, clear vision, shines and gives the desired physique. Massage with various oils; *Udavartana* and *Udgharshana* pacify vitiated *Kapha*, help to dissolve fat and built up a strong body. These massages strengthen calf

and thigh muscles which are very susceptible to injury. The downward massage mardana while squeezing the muscles is helpful in pacifying mamsagata vata. Another massage samvahanam increases strength, alleviates vitiated vata and kapha doshas and removes fatigue. The massage with feet; Padaghata strengthens muscles and helps to combat stress. The massage with medicated oils improves fitness, cures injuries, heals damaged muscles, stimulates blood circulation, releases stress, and reduce pain and tension<sup>[15-18]</sup>.

Ayurveda also suggests some rules for exercise (vyayama). It is mentioned in Samhitas that person should perform exercise up to half of his complete strength i.e. “ardhashakti vyayama”<sup>[41]</sup>. By analysing a person’s bala by sar parikshan one can estimate his complete strength and after that time, the duration and type of exercise can be decided. Practicing the same thing and gradually increasing it can help in avoiding injuries.

Use of proper ailments like helmets during that particular sport can help to avoid injury to the particular organ. e.g wearing of proper shoes (padatrandharanam) is “padarvyosanaapaham, balya parakram sukham vrushyam padatradharanam”<sup>[42]</sup>. Shalya Tantara treatment modalities like Agnikarma, marmachikitsa and

Raktamokshana are beneficial to chronic musculoskeletal disorders.

### CONCLUSION-

The ancient reference text of Ayurveda doesn’t have a direct reference of sports medicine but has stated various aspects which may be correlated with sports injuries and their treatment and indirectly gives an idea about sports medicine. While dealing in sports medicine prevention of sports injuries plays an equal role as treatment of it. Some injuries are difficult to treat and sometimes need surgery. Rehabilitation of such is also difficult and time-consuming. To avoid them, the concept of *sar pariksha* helps a lot. It gives a general idea of the individual’s strength. Individuals having a good quality of *mamsa*, *asthi* and *majjadhatu (sar)* have good physical strength, stamina and perform well in any sport. Individuals with depleted *dhatu (asar)* can be treated to enhance their strength and stamina with *adravya* and *dravya chikitsa* in supplementary form or as part of their daily routine.

*Abhyanga*, *udavartana*, *samvahana*, *vyayam*, proper techniques of exercise like *ardha shakti vyayama*, *padtran dharanam* are helpful in increasing the individuals’ sport stamina and also prevents getting injured. *Dravyas* like *rasayan dravya*, drugs of *jeevaniya gana*, *bruhaniya gana*, *shramhara gana* increase

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