

ROLE OF AYURVEDA IN THE PREVENTION AND PROMOTION OF HEALTH IN FEMALE ATHLETE TRIAD

Soubhagya G Mathapati¹, Venkatakrisna K.V.²

1. Final year PG Scholar, Department of PG Studies in Swasthavritta, Government Ayurveda Medical College and Hospital Mysuru, Karnataka, India.
2. Professor and Head, Department of PG Studies in Swasthavritta, Government Ayurveda Medical College and Hospital Mysuru, Karnataka, India.

Corresponding Author: soubhagyamathapati9@gmail.com

<https://doi.org/10.46607/iamj1811112023>

(Published Online: November 2023)

Open Access

© International Ayurvedic Medical Journal, India 2023

Article Received: 09/10/2023 - Peer Reviewed: 25/10/2023 - Accepted for Publication: 10/11/2023.



ABSTRACT

The Female Athlete Triad is a complex syndrome involving disordered eating, amenorrhea, and osteoporosis, which frequently affects female athletes. Ayurveda, an ancient system of medicine, plays a significant role in addressing and preventing the Female Athlete Triad through its holistic approach to health and well-being. The main aim of Ayurveda is “*Swasthasya Swasthya Rakshanam*” and “*Prakritistapana*” to regain the physical fitness of a female athlete back to normal as early as possible by focusing on strength and power development, dietary considerations, lifestyle choices, and stress management, Ayurveda can play a vital role in optimising the health and performance of female athletes while mitigating the risks associated with the triad. It acts as both preventive and curative therapy.

Keywords: Female Athlete Triad, Sports Medicine, Ayurveda, Prakritistapana

INTRODUCTION

‘Sports medicine’ is a branch of medicine that deals with physical fitness, treatment and prevention of injury related to sports and exercise. There is no direct

mention of sports medicine in ancient or modern medicine. Sushruta Samhita is the first literature in which *Yuktaseniya Adhyaya* explains the importance

of physical strength in one who wants to win.¹ The Female Athlete Triad is a complex health issue that primarily affects female athletes, consisting of three interrelated conditions: disordered eating, amenorrhea (absence of menstruation), and osteoporosis (loss of bone density).² Ayurveda, the oldest system of medicine still holds good for the current era and has various preventive and promotive modalities for the Female Athlete Triad.

Aims and Objectives

1. To study and understand the Female Athlete Triad through the Ayurveda perspective and find a Solution.
2. To achieve *Prakritisthapana* in Sports Person by regaining the physical fitness of a female athletes
3. To adopt Ayurvedic modalities to increase performance and reduce the risk of injuries.

Methods

A comprehensive literary review of textbooks, classical Ayurveda textbooks, sports medicine textbooks, and related online publications using PubMed articles and conference papers referred to understand the concepts and to utilize them in reducing the risk of injuries in Female Athletes and achieving *Prakritisthapana*.

Female Athlete Triad –

The Female Athlete Triad is a combination of three interrelated conditions associated with athletic training- Disordered eating, Amenorrhea, and Osteoporosis.

1. Disordered eating: Athletes with disordered eating may engage in a wide range of harmful behaviours, such as strict food restriction followed by binge eating, then purging to lose weight or maintain a thin physique. Athletes often suffer from Anorexia nervosa or bulimia nervosa, sometimes they may occur together.
2. Amenorrhea: Amenorrhea that is related to athletic training and weight fluctuation is caused by changes in the hypothalamus. These changes result in decreased levels of estrogen. Amenorrhea in the female athlete triad may be classified as primary or secondary. Other menstrual irregularities tend to occur among athletes most commonly

including anovulatory cycles, irregular menstruation, oligomenorrhea, and amenorrhea.

3. Osteoporosis: Osteoporosis is characterised by a decrease in bone mass and mineral density and a deterioration in microarchitecture, resulting in loss of bone strength and a greater risk of fracture.³

Prevalence

Studies suggest that between 15 and 62% of the female athletic population exhibit disordered eating behaviors. Amenorrhea among female athletes ranges between 3- 66%, depending on the definition that is used. 2–7% Some components of the female athlete triad are often undetected because of the secretive nature of disordered eating behaviour and the commonly held belief that amenorrhea is a normal consequence of training.⁴

Risk factors

The development of poor self-image and pathogenic weight control behaviours in female athletes are caused by many factors. Frequent weight, punitive consequences for weight gain, pressure to “win at all costs,” an overly controlling parent or coach, and social isolation caused by intensive involvement in sports may increase an athlete's risk.

Societal perpetuation of the ideal body image may intensify the endeavour for a thin physique. Athletic endeavours such as gymnastics, figure skating, ballet, distance running, diving, and swimming that emphasize low body weight and a lean physique can also increase the risk of developing the female athlete triad.⁵

Gender and performance⁶.

Gender issues in sports and exercise are concerned with genetic, hormonal, anatomical, physiological, psychological, and sociological aspects as well as those of sports performance and body image.

Female world record performances are still only 90%–95% of that of males, and in all but a minority of sports, women will probably never equal or surpass male performance. Anatomical and physiological reasons for this are considered below.

Stature and body mass

Females are on average shorter in height—1.6 m in

contrast to males' average height of 1.7 m.

Ayurveda also explained the gender differences as per body mass and stature. The measurement of the male's chest and the female's waist is identical. The chest of the female is 18 *Angulas*, so the same is the waist of the male. The chest of the male is said to be 12 and 24 *Angulas* by Dalhana and 24 *Angulas* by Chakrapani. The male's chest and the female's waist are relatively broader.⁷

Skeletal differences

Women have narrower shoulders, shorter arms with a wider carrying angle, broader hips, and shorter legs. Shoulder arm difference and smaller muscle mass in women account for weaker upper-body compared to lower-body strength in women than in men. Women have broader hips creating a greater angle of the femur to the knee (*genuvallum*), causing many women to throw their heels out when running.⁶

Flexibility:

Women have better flexibility than men, which is advantageous in gymnastics and dance. Hypermobility of the joints can bring problems like weakness in the skeletal muscles.⁶

Exercise and changes in menstrual cycle

Physical exercise produces marked changes in the post-exercise pulsatile secretion of LH, FSH, estrogen, progesterone, and cortisol. The more intense and longer the duration of exercise the greater the effect, resulting in marked changes in the menstrual cycle.⁸

Stage 1- Normal follicular, normal luteal phase

Stage 2- Prolonged follicular and a shortened luteal phase results in defects associated with infertility and premenstrual tension.

Stage 3- Eu-estrogenic anovulatory oligomenorrhea, hyperprolactinemia, and the possibility of endometrial hyperplasia adenocarcinoma if this phase persists. Oligomenorrheic athletes also begin losing bone mineral density.

Stage 4- Hypoestrogenic—amenorrhea leads to osteoporosis and genital atrophy.

DISCUSSION

Female athlete Triad and Ayurveda

Sports medicine is a separate medical speciality. Ayurveda has preventive and curative applications and plays a major role in sports medicine. Female Athlete Triad symptoms can be compared in Ayurveda as follows.

1. Disordered eating – *Prajnaparadajanya Ahara and Vihara*
2. Menstrual Irregularities – *Artava vikaras* like, *Anartava, Nastartava, Arthavakshaya, Udavartini Yoni Vyapad etc.*
3. Osteoporosis – *Sandigata vata and Asthigata Vata*

Nidana-

Aharaja, Viharaja, and Manasika Nidanas are causes for the Female athlete triad, explained under various concepts in Ayurvedic classics. **Aharaja:** *Akala bhojana, Alpa matra Bhojana, Ati Matra bhojana, Viruddha bhojana, Ati tikshna, ati mamsa vardhaka ahara* these are causing the *agni dusti* and *vata* and *pitta dosha prakopa* forms the improper formation of *rasa* and *arthava*.

Viharaja: *Ati vyayama, nitya ati vyayama, prapatana and vegadharana.*

Manasika: *Bhaya, Krodha, Manasika santapa.*

Lakshana and Samprapti -

1. **Disordered eating** – Due to *Akala Bhojana, Ati Matra Bhojana, Alpa Matra Bhojana, Viruddha Ahara* improper indulgence *Vamana* and improper use of *Virechana Yogas* causes vitiation of *Agni* and *Rasadhatu*.
2. **Menstrual irregularities (Artava Vikara)** – Different *Artava Vikaras* can be taken in menstrual irregularities like *Anartava, Atyartava, Udavartini Yonivyapad, Nastartava, And Ksheena Artava* etc.
3. **Osteoarthritis (Sandhivata)** – Due to *Vata kara Ahara and Vihara – Vata Vriddi and Kapha Kshaya* cause symptoms like *Sandi Vata* and *Sandhi Shunyata* respectively.

The combined *Nidana, Lakshana, and Samprapti* are shown in fig no. 1.

Due to these *Nidanas* athletes, fail to form proper *Rasa Dathu* and *Arthava (Upadhatu)*. Heavy training

and disordered eating can result in a percentage of body fat that is too low to be healthy and associated with amenorrhea. Heavy training, disordered eating, and amenorrhea can result in osteoporosis.

Role of Trayopastamba

Ahara

Ahara (nutrition and diet) plays a critical role in the Female Athlete Triad, as proper nutrition is essential for preventing and managing disordered eating, amenorrhea, and osteoporosis. Ensuring that female athletes have access to the right nutrition and support can help reduce the risk of these health concerns and promote their overall well-being and athletic performance.

Nidra

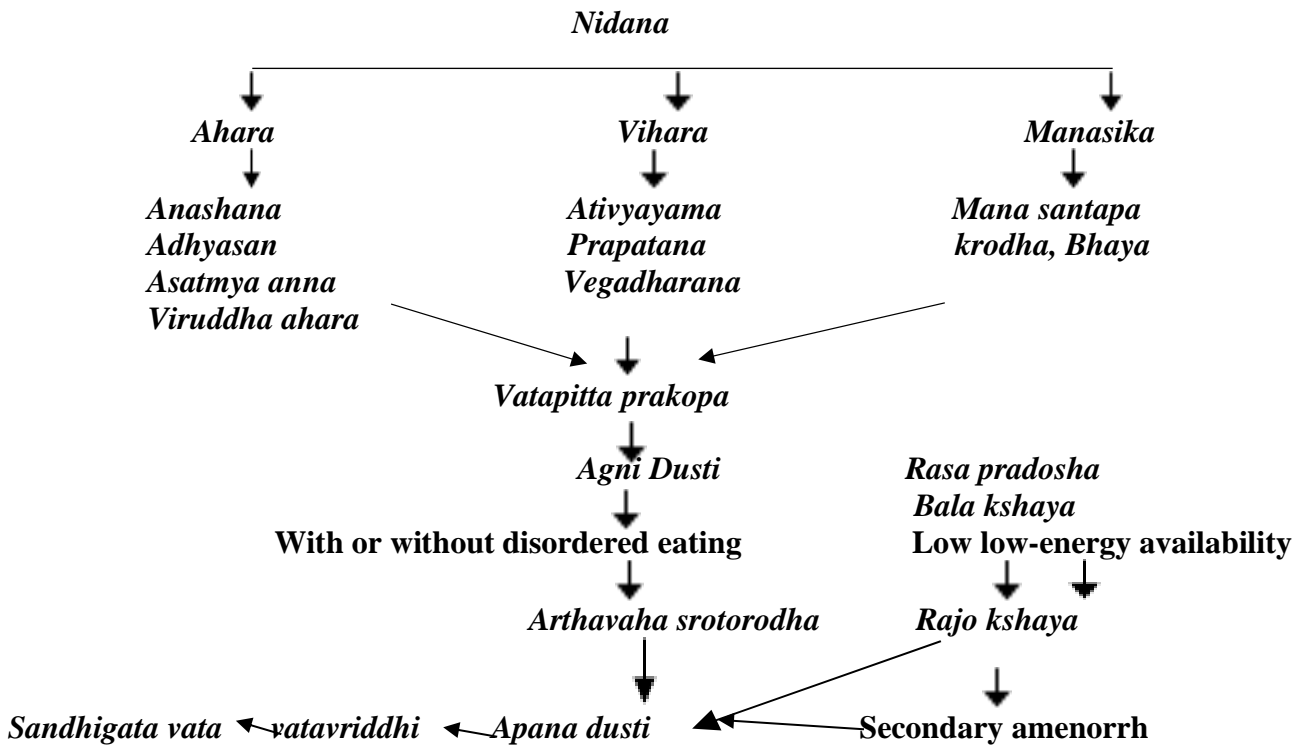
“Nidrayatam Sukham Dukham Pushti Karshyam Bala Abalam, Vrishta Klibta Gyan Agyanam Jivitam Na Cha.”⁹ Nidra (sleep) is explained as one of the Trayopstambha in Ayurveda. During sleep, the hormones that govern muscular growth and repair are most active. With poor sleep habits and interrupted sleep, one cannot optimize growth and development

capabilities. So, it is important to get 7-8 hours of quality sleep. Adequate sleep is crucial for the body's recovery and repair processes. When female athletes engage in intense training or exercise routines, they put their bodies under stress. Sleep allows the body to repair and rebuild tissues, including muscle and bone. Sleep also plays a significant role in hormonal balance, energy restoration, stress reduction and maintaining mental health.

Brahmacharya

Increased frequency, intensity, and duration of exercise were found to be significantly correlated with decreased fertility in women, and associated with anovulatory cycles.¹⁰ Mithyachara, the improper practice of Ahara, Nidra, and Brahmacharya are the Nidana for Arthava Dusti and leads to Vandhyatva, Maituna Asahishnuta and Arthava Nasha.¹¹

Chart no. 1 Samprapti of Female Athlete triad



Prevention and promotion of female athlete health

Ayurveda offers a holistic approach to health and well-being. Mainly includes the Swastha

Rakshanartha Chikitsa and *Prakriti Stapanartha Chikitsa* detailed treatment modalities.

Preventive Measures: Ayurveda places a strong emphasis on preventive healthcare. Female athletes can benefit from Ayurvedic principles to prevent the onset of the triad by maintaining a balanced lifestyle, nutrition, and exercise routine.

Swastha paripalana – The rightful indulgence of *Dinacharya*, *Rutucharya*, *Sadvritta*, *Ahara*, and *Vihara* helps to maintain both physical and mental health. This approach focuses on increasing energy intake, restoring normal menstrual function, and addressing bone health through nutrition, counselling, and exercise adjustments.

Role of Snehana and Swedana

Snehana involves the application of herbal oils to the body and can help with relaxation, improving circulation, and reducing muscle tension. In the context of female athletes, regular oil massages may aid in reducing stress and muscle soreness, which can be beneficial for overall health and well-being. *Swedana* involves inducing sweating, typically through steam or herbal treatments. It is believed to help eliminate toxins from the body and improve circulation. While not a direct treatment for the Female Athlete Triad, *Swedana* can promote overall detoxification and relaxation. Sweating can also have a positive effect on skin health. Stress reduction and relaxation techniques can help athletes better manage their mental and emotional health, potentially reducing the risk of disordered eating.

Role of Panchakarma-

Panchakarma therapies that focus on improving overall health and vitality may indirectly contribute to better bone health. However, the primary management of osteoporosis associated with the Triad should involve medical intervention like *Basti Karma* (*Tikta Ksheera Basti*) helps to maintain bone health. *Rasa* and *arthava* are the main *dusti* in this condition hence therapeutic *Vamana* and *Virechana* are also indicated.

Role of Rasayana

The physical and mental resilience of the sportsman indicates good health with *Tridosha* and *Saptadhatu*

in their normal state. In Caraka Samhita explained, *Rasayanais* the method of acquiring the best qualities of *Rasadi Dhatus*.¹² For improving general health and specifically enhancing *Mamsadhatu* and *Snayu*, single *Rasayana* herbs or formulations can be used based on the specific needs and conditions of female athletes. *Rasayana* herbs or formulations for a female athlete triad, it's essential to consider the individual's unique constitution, current health condition, and specific athletic requirements. Some of the *Rasayana* herbs and formulations that can be considered include *Ashwagandha*, *Shatavari*, *Bramhi*, *Musali*, *Bala* etc.

Role of Satvavajaya

Effect on Stress: Muscle tension is greatly increased when the body is experiencing a stress reaction. Some of the popular ones are neck and back tension, headache, tightness in the chest and shallow breathing, gastrointestinal symptoms. For the athlete, the excess body tension interferes with all aspects of the game. The hormones and chemicals that are actively produced under these circumstances, affect the working of small and large muscle groups of the body and impair the ability to concentrate, retrieve necessary information from the subconscious mind needed to assess the situation and adapt needed skills to meet it. Stress Management modalities are *Shirodhara*, *Shiroabhyanga*, *Padabhyanga*, *Samhanana Yogasana*, *Pranayama Dhyana* etc.

Role of Ahara: Ayurveda emphasizes the importance of a balanced and nourishing diet tailored to an individual's *Prakriti* and *Vikriti*. Female athletes with the triad can benefit from Ayurvedic dietary guidance to ensure they receive adequate nutrition to support their physical demands without resorting to disordered eating practices. In various sports activities, the most involved structures are *Asthi* for various locomotory activities using *Mamsa* hence *Asthi poshak* and *Mamsavardhaka* foods mentioned in classics must be advised for sports person.

Role of Vihara

Abhyanga: Ayurvedic massage, such as *Abhyanga*, helps to reduce *Shrama*, and *Vata Dosha* and gives *Pushti* to the *Shareera*.¹³ It can be a valuable addition

to an athlete's or fitness enthusiast's routine. It can aid in pre- and post-exercise preparation, recovery, injury prevention, pain relief, enhanced endurance, stress reduction, and improved blood circulation. However, it should be used in conjunction with other aspects of sports training and injury prevention for a comprehensive approach to athletic performance and health.

Udvardhana:¹⁴ *Udvardhana* involves upward and downward movements with oils and dry powders, using the palm and fingers. It is often performed before exercise to prepare the muscles and joints. It can help with flexibility and reduce the risk of injuries.

Udgharshana¹⁵ *Udgharshana* is a more forceful rubbing technique, typically done with dry powders. It creates greater friction and is used to strengthen the calf and thigh muscles. This technique may be particularly useful for athletes looking to enhance muscle strength.

Utsadana:¹⁶ *Utsadana* involves very gentle rubbing, especially with medicated oils. It is a soothing technique that can be used for relaxation and stress reduction.

Samvahana: *Samvahana* is a gentle tingling massage with oils that aims to reduce fatigue and promote a pleasing sense. It can be used to help muscles regain vitality and reduce post-exercise tiredness.¹⁷

Vyayama: *Vyayama* helps improve the tonicity and strength of muscles. Regular exercise can lead to muscle growth and enhanced muscular strength. This is referred to as "*Suvibhaktata*"¹⁸ and "*Vibhakta Gatravam*"¹⁹. In Charaka Samhita and Astanga Hridaya emphasized the development of endurance as a result of regular exercise. This endurance described as "*Duhkha Sahishnuta*"²⁰ and "*Karma Samarthyā*"¹⁹ represents the capacity to withstand and perform under high levels of physical stress in the Female Athlete Triad.

Others

Individualized Approach: Ayurveda assesses each person as unique, considering their constitution and imbalances. This personalized approach allows for targeted interventions to address the specific needs of

female athletes dealing with the triad.

Hormonal Balance: Ayurveda offers herbal remedies and dietary recommendations to support hormonal balance. This can be particularly beneficial for athletes experiencing amenorrhea or irregular menstrual cycles.

Lifestyle Modifications: Ayurveda promotes a balanced lifestyle that includes adequate rest, stress management, and regular exercise. Female athletes should focus on exercise routines that align with their body type and energy levels, avoiding excessive training that can contribute to the triad.

CONCLUSION

The gender differences highlight the importance of including strength and power training in the training regimen of female athletes, as well as monitoring the female athlete for factors that contribute to the Female Athlete Triad. Focusing on strength and power development will improve performance and reduce the risk of injury. Ayurveda can be a valuable complementary approach to preventing and managing the Female Athlete Triad by addressing an athlete's health's physical, mental, and nutritional aspects. Integrating Ayurvedic principles into sports medicine can contribute to female athletes' overall well-being and success.

REFERENCES

1. Sushruta, Sushruta Samhita, Dalhanacharya, Yadavji Trikamji, sutra stana, Aturopakramaniya adhyaya, published by Chaukamba Orientalia Varanasi, Reprint 2019, Pg no. 146
2. Jeffrey R. Bytowski and Claude T. Moorman, III. Oxford American Handbook of Sports Medicine, Oxford University Press 2010, Page no 534
3. Jeffrey R. Bytowski and Claude T. Moorman, III. Oxford American Handbook of Sports Medicine, Oxford University Press 2010, Page no 534
4. Women's Sports Foundation. The female athlete triad <https://www.womenssportsfoundation.org/inspiration/the-female-athlete-triad/>
5. Jeffrey R. Bytowski and Claude T. Moorman, III. Oxford American Handbook of Sports Medicine, Oxford University Press 2010, Page no 534,
6. Jeffrey R. Bytowski and Claude T. Moorman, III.

- Oxford American Handbook of Sports Medicine, Oxford University Press 2010, Page no 520
7. Sushruta, Sushruta Samhita, Dalhanacharya, Yadavji Trikamji, sutra stana, Aturopakramaniya adhyaya, published by Chaukamba Orientalia Varanasi, Reprint 2019, Pg no. 150
 8. Jeffrey R. Bytowski and Claude T. Moorman, III. Oxford American Handbook of Sports Medicine, Oxford University Press 2010, Page no 527
 9. Charaka Samhita: Revised by Charaka and Dridhabala with the Ayurveda Dipika commentary of Chakrapanidatta. Edited by Yadavji Trikamji Acharya. Chaukambha Orientalia Varanasi: Reprint 2015. Sutra Pg no. 118
 10. Gudmundsdottir SL, Flanders WD, Augestad LB. Physical activity and fertility in women: The North-Trøndelag health study. *Hum Reprod.* 2009;24:3196–3204. doi: 10.1093/humrep/dep337.
 11. Sushruta, Sushruta Samhita, Dalhanacharya, Yadavji Trikamji, Shareera stana, Dhamani Vyakarana Adhyaya, published by Chaukamba Orientalia Varanasi, Reprint 2019, Pg no. 386
 12. Charaka Samhita: Revised by Charaka and Dridhabala with the Ayurveda Dipika commentary of Chakrapanidatta. Chikitsa stana , rasayana adhyaya, Edited by Yadavji Trikamji Acharya. Chaukambha Orientalia Varanasi: Reprint 2015. Sutra Pg no. 376
 13. Vagbhata, Astanga Hrudaya, Sarvangasundari of Arunadatta, Dinacharya adhyaya, Ayurveda Rasayana of Hemadri, Chaukamba Sanskrita sansthana, Varanasi, 2014, Page no. 26
 14. Sushruta, Sushruta Samhita, Dalhanacharya, Yadavji Trikamji, published by Chaukamba Orientalia Varanasi, Reprint 2019, Pg no. 489
 15. Sushruta, Sushruta Samhita, Dalhanacharya, Yadavji Trikamji, chikitsa stana, Anagatabadha pratisheda adhyaya, published by Chaukamba Orientalia Varanasi, Reprint 2019, Pg no. 489
 16. Sushruta, Sushruta Samhita, Dalhanacharya, Yadavji Trikamji, Chikitsa stana, Anagatabadha pratisheda adhyaya, published by Chaukamba Orientalia Varanasi, Reprint 2019, Pg no. 489
 17. Sushruta, Sushruta Samhita, Dalhanacharya, Yadavji Trikamji, Chikitsa stana, Anagatabadha pratisheda adhyaya, published by Chaukamba Orientalia Varanasi, Reprint 2019, Pg no. 490
 18. Sushruta, Sushruta Samhita, Dalhanacharya, Yadavji Trikamji, Chikitsa stana, Anagatabadha pratisheda adhyaya, published by Chaukamba Orientalia Varanasi, Reprint 2019, Pg no. 488
 19. Vagbhata, Astanga Hrudaya, Sarvangasundari of Arunadatta, Dinacharya adhyaya, Ayurveda Rasayana of Hemadri, Chaukamba Sanskrita sansthana, Varanasi, 2014, Page no. 27
 20. Charaka Samhita: Revised by Charaka and Dridhabala with the Ayurveda Dipika commentary of Chakrapanidatta. Sutrastana, Navegandharaneeya adhyaya, Edited by Yadavji Trikamji Acharya. Chaukambha Orientalia Varanasi: Reprint 2015. Sutra Pg no. 50

Source of Support: Nil

Conflict of Interest: None Declared

How to cite this URL: Soubhagya G Mathapati & Venkatakrishna K V: Role of Ayurveda in The Prevention and Promotion of Health in Female Athlete Triad. *International Ayurvedic Medical Journal* {online} 2023 {cited November 2023} Available from: http://www.iamj.in/posts/images/upload/2776_2782.pdf