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Review Article

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Anatomical and Physiological Aspects of Asthi Shaarira: Ayurvedic Management of Related Abnormalities

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Abstract

The three basic elements that maintain the body's structure and function are *Dhatu*, *Dosha*, and *Mala*. *Dhatu's* primary functions are support and nourishment. *Asthi Dhatu* is one of the seven *Dhatus* that provides stability, support, and structural integrity to human body. Healthy *Asthi Dhatu* allows the body to maintain normal posture and engage in regular physical activity. The diagnosis and treatment of musculoskeletal problems require a deep comprehension of *Asthi Shaarira*, or the anatomy and physiology of bones and joints. The main purposes of *Asthi*, according to Ayurveda are *Deha Dharana*, *Majja Pushti* and giving attachment and support to *Mamsa* and *Snayu*. *Asthi* connects various bodily parts, facilitates movement, maintains posture, and helps in the nutrition of neural tissue to construct the stiff internal skeleton of the body. The *Sushruta Samhita* lists 300 bones, which are divided into 63 in the head and neck, 117 in the trunk and 140 in the extremities. *Asthi Shaarira* disorders can result from pathological diseases, trauma, surgical damage, or malnutrition. Several *Vikaras* such as *Adhyasthi*, *Asthishoola*, *Asthitoda*, *Kunakha* and *Vivarnata* are described in classical Ayurvedic scriptures. *Anchana*, *Pidana*, *Sankshepa* and *Bandhana*, etc. are the tenets of *Asthibhagna Chikitsa* which restore anatomical continuity and improves functioning integrity.

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1. Introduction

According to Ayurveda, *Dhatu* are the basic bodily tissues that support the body's structure and physiological processes. Depending on genetic and developmental variables, these tissues give rise to different organs and bodily structures through their sequential development and interaction. The body's bone tissue is represented by *Asthi Dhatu*, the fifth of the seven *Sapta Dhatu*, which arises from *Meda Dhatu*. Both traditional and classical medical sciences have long acknowledged the importance of bones. Ayurveda views *Asthi Dhatu* as essential to preserving the body's stability, form, and functional integrity. The human body is made up of hard skeletal components and soft tissues, just as the physical universe is made up of both hard and soft things that are equally necessary for survival. (1, 2)

The body's stiff framework, made up of bones and teeth, facilitates mobility, maintains posture and shields important organs from harm. As the point of attachment for muscles, tendons, and ligaments, *Asthi Dhatu* plays a crucial role in maintaining the body's architecture by

facilitating coordinated movement and structural integrity. Because it survives the deterioration of the majority of other tissues, it is thought to be one of the body's most resilient tissues. The human body depends on strong, healthy bones to preserve its shape, strength, and general functionality.

Ayurveda described many pathological conditions associated with *Asthi Dhatu*; *Asthi Vriddhi* and *Asthi Kshaya* amongst them. The abnormal rise of *Asthi Dhatu* that causes excessive bone development or bony overgrowths is referred to as *Asthi Vriddhi*. According to classical sources, this disorder is characterized by excessive tooth development and the deposition of new bone over preexisting bone structures. The depletion or degeneration of *Asthi Dhatu* is indicated by *Asthi Kshaya*. The preponderance of exacerbated *Vata Dosha* is reflected in its clinical manifestations, which include severe bone pain, brittle bones, teeth, and nails, joint weakness, and excessive dryness. (3-5)

Depending upon *Dosha* predominance *Asthi Dhatu* possesses different features as depicted in **Table 1**.

Table 1. Characteristics of *Asthi Dhatu* based on *Dosha Prakriti*

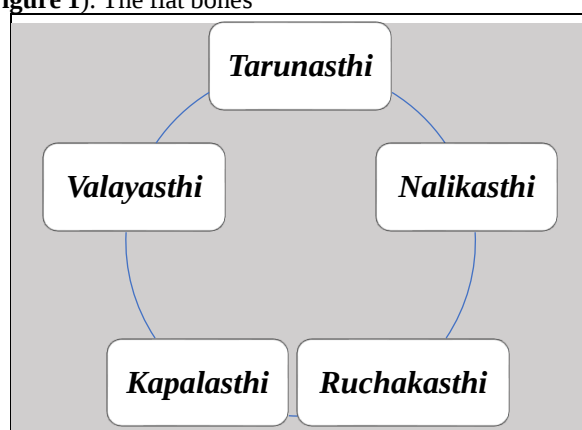
<i>Prakriti</i>	Characteristics of <i>Asthi Dhatu</i>
<i>Vata Prakriti</i>	Bones are relatively light, thin, and less dense. <i>Rukshata</i> predominates, leading to reduced bone strength and joint lubrication.
<i>Pitta Prakriti</i>	Bones are of moderate strength, while joints are comparatively softer and more flexible due to the predominance of <i>Drava Guna</i> .
<i>Kapha Prakriti</i>	Bones are dense, strong, heavy, and well-developed. <i>Snigdha</i> and <i>Sthira</i> qualities provide excellent structural support and joint stability.

2. Types and Number

Classical texts differ in how *Asthi* is distributed throughout the body. The *Sushruta Samhita* lists 300 bones, which are divided into 63 in the head and neck (*Greevordhva*), 117 in the trunk (*Shroni*, *Parshva*, *Prushtha*, and *Uras*), and 140 in the extremities (*Shakha*). *Ashtanga Sangraha*, on the other hand, lists 360 bones, including 100 in the upper torso, 120 in the trunk, and 140 in the extremities.

Based on their shape and function, Ayurveda divides bones into five main categories (**Figure 1**). The flat bones

known as *Kapalasthi*, which are located in the skull, palate, shoulder, hip, knee, and temporal area, shield the brain. The hands, feet, ribs, back, and thighs include *Valayasthi*, which are curved or ring-shaped bones. *Tarunasthi* are soft or cartilaginous structures seen in the nose, ear, orbit, and neck, and they are primarily seen in youngsters. Long, hollow bones called *Nalikasthi* are found in the limbs, including the phalanges, tibia, femur, and humerus. The teeth, known as *Ruchakasthi*, are either 28 or 32 permanent teeth that help in mastication and taste perception. (4-6)

**Figure 1.** Types of *Asth*

3. Physiological Importance

Asthi Dhatu is essential for preserving the human body's stability, strength, and structural integrity. While an imbalance in *Asthi Dhatu* leads to a variety of musculoskeletal conditions, proper *Asthi Dhatu* feeding guarantees healthy bones, teeth, joints, and nails. *Asthisara* is characterized by massive, robust, well-developed bones, especially those of the heels, ankles, knees, forearms, scapulae, chin, head, and finger joints. These people also have a well-built body, strong teeth and nails, great muscular endurance, enthusiasm, and resilience. *Asthi Dhatu's* essential roles include supporting the body's structure (*Deha Dharana*), preserving posture, safeguarding important organs, enabling mobility by acting as a point of attachment for muscles & ligaments and nourishing *Majja Dhatu*. (5-7)

4. Anatomical Aspect

According to Ayurveda, *Asthi Dhatu* is nourished and formed by the successive transformation of the seven *Dhatu*, each of which is controlled by its own *Dhatvagni*. Each *Dhatu* is created from its predecessor following digestion by the appropriate *Agni*. Thus, *Rasa* becomes *Rakta*, *Rakta* becomes *Mamsa*, *Mamsa* becomes *Meda*, *Meda* becomes *Asthi*, *Asthi* becomes *Majja*, and *Majja*

becomes *Shukra Dhatu*. According to *Acharya Charaka* in *Chikitsa Sthana*, *Shukra Dhatu* eventually helps in the formation of *Garbha* under appropriate physiological conditions, demonstrating the ongoing process of tissue nourishment and regeneration.

Asthidhatvagni is primarily responsible for the development of *Asthi Dhatu* from *Meda Dhatu*. The nutritional portion obtained from *Ahararasa* is affected by this tissue-specific metabolic fire, especially the *Prithvi*, *Agni* and *Vata*. The hard and compact *Asthi Dhatu*, which constitutes the body's structural skeleton, is created through this metabolic change from the softer *Meda Dhatu*. While the other *Mahabhutas* contribute to the maturation and functional qualities of bones, the *Prithvi Mahabhuta* predominates and gives them hardness, density, and stability. (7-9)

The musculoskeletal system's embryonic development starts early in fetal life, *Shukra* is the source of *Asthi* and *Mamsa*, from which *Snayu* are eventually made. Growth of muscles, ligaments, and bones starts during the first two months of pregnancy. *Asthi* is considered the primary *Ashraya* of *Vata Dosha*, and *Vata* is its *Ashrayi*. The body's stiff framework is made up of bones, which are closely linked to *Sira*, *Dhamani* and *Snayu* to preserve structural integrity and enable mobility. *Kesha* and *Nakha*

are considered the waste products (*Mala*) of *Asthi Dhatu*, whereas *Danta* is referred to as the *Upadhatu* of *Asthi*. *Asthi*'s structural role is reflected in its distinctive characteristics, which include *Guru*, *Kathina*, *Sthula*, *Khara* and *Sthira*. (6-8)

5. Diseases and Management

Asthi Sharira disorders can result from pathological diseases, trauma, surgical damage, or malnutrition. Several *Asthi Pradoshaja Vikaras*, such as *Adhyasthi*, *Asthibheda*, *Asthitoda*, *Dantabheda*, *Vivarnata* and *Kunakha* are described in classical Ayurvedic scriptures. Depending on the type of bone involved, traumatic injuries have distinctive effects; *Tarunasthi* tends to bend, *Nalikasthi* frequently gets fractures, *Kapalasthi* typically cracks, *Valayasthi* may fracture or fissure and *Ruchakasthi* frequently fragments.

Skeletal injuries are generally divided into two categories in ancient Ayurvedic literature; *Kandabhagna* and *Sandhimukta*. *Churnita*, *Ashwakarna*, *Pichchita*, *Asthichallita*, *Majjanugata*, *Kandabhagna*, *Atipatita*, *Chhinna*, *Vakra* and *Sphutita* are among the several types of fractures; many of these closely mirror contemporary fracture categories. *Anchana*, *Pidana*, *Sankshepa* and *Bandhana* are the tenets of *Asthibhagna Chikitsa* which together seek to restore anatomical continuity and encourage efficient healing.

According to a person's *Prakriti* the management of *Asthi Dhatu* in Ayurveda seeks to restore the equilibrium of the *Prithvi* and *Vayu Mahabhuta*. People with *Vata* constitution are more prone to bone deterioration and depletion those with a *Kapha* constitution often have stronger bones. *Pitta* people typically have modest bone strength, but extended exposure to heat or *Vata* aggravation might cause *Asthi* diseases. (7-9)

Nourishing foods high in the earth element, such as whole grains, milk, nuts, seeds, and root vegetables, are advised to strengthen bones in *Vata* related *Asthi* diseases. A light diet rich in green vegetables, fruits, spices, and bitter and pungent flavors helps lower excess earth element in *Kapha* predominance. *Yoga* and exercise are crucial for maintaining bone strength and enhancing bone metabolism.

Traditionally, a number of Ayurvedic herbs have been suggested to support bone health. *Amalaki* and *Bhringaraja*, etc. are thought to be helpful for repairing fractures and nourishing bones, especially in *Vata* illnesses. *Guggulu* and *Kutki* are frequently used to treat bone diseases associated with *Kapha* and purify *Asthi Dhatu*. Healthy *Asthi Dhatu* can be maintained and restored with the use of a balanced diet, lifestyle changes, *Yoga*, meditation, and herbal therapy. (8-10)

6. Conclusion

The skeletal system is called *Asthi Sharira* in Ayurveda, and *Asthi Dhatu* is considered one of the seven vital bodily tissues which preserving the body's stability and structural integrity. *Asthi* is categorized as a *Pitruja Avayava*. The *Prithvi* and *Vayu Mahabhutas*, give it distinctive qualities like hardness, roughness, firmness, solidity, and durability, make up the majority of its

composition. Ayurveda also divides bones into a number of categories, including *Taruna Asthi*, *Nalika Asthi*, *Ruchaka Asthi* and *Kapala Asthi*. Each type has different structural and functional roles and is found in different parts of the body. The majority of *Asthi* diseases are linked to the aggravation of *Vata Dosha*. Ayurveda suggested various therapeutic options for the management of *Asthi* diseases which includes *Yoga*, herbal therapy and other approaches like *Anchana*, *Pidana*, *Sankshepa* and *Bandhana*, etc. These Ayurvedic approaches helps in the management of various diseases associated with bones and skeletal system.

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Conflict of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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