

## OBSERVATIONAL STUDY OF ANATOMICAL CHANGES OCCURRING IN PADA KURCHA DUE TO LONG-TERM STANDING PROFESSIONS

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### ABSTRACT

Ayurveda gives prime importance to Rachana Sharir for understanding the structural basis of physiological and pathological processes. Pada Kurcha is an important anatomical entity described in classical Ayurvedic texts, predominantly composed of Snayu and Dhamani, and is located in the region of the foot. Long-term standing professions impose continuous mechanical stress on the foot, especially over the plantar structures, which may lead to degenerative and inflammatory changes. In modern anatomy, the plantar aponeurosis closely resembles the Ayurvedic concept of Pada Kurcha in terms of structure, function, and clinical significance. The present observational study was undertaken to assess anatomical and structural changes occurring in Pada Kurcha among individuals involved in long-term standing professions. A comprehensive literary review of Ayurvedic and modern texts was conducted, followed by cadaveric dissection and clinical observation of

100 subjects engaged in prolonged standing. Ultrasonographic evaluation was used to assess thickness, integrity, and echogenicity of the plantar fascia. The findings revealed a significant association between prolonged standing and structural alterations in the plantar aponeurosis, including increased thickness, hypoechoic changes, and partial tears. These changes can be correlated with the Ayurvedic description of Kurcha Dushti, leading to pain, stiffness, and

functional impairment. The study establishes a conceptual and anatomical bridge between Pada Kurcha and plantar aponeurosis, highlighting the occupational risk factors and emphasizing preventive strategies.

**KEYWORDS:** Pada Kurcha, Plantar Aponeurosis, Long-Term Standing, Rachana Sharir, Plantar Fasciitis.

## INTRODUCTION

Ayurveda, the ancient science of life, emphasizes a holistic understanding of health by integrating structural, functional, and clinical knowledge of the human body. Rachana Sharir forms the foundation of diagnosis, prognosis, and therapeutic planning in Ayurveda. Acharya Sushruta, regarded as the pioneer of surgical anatomy, provided a detailed account of human anatomy through cadaveric dissection, emphasizing the indispensability of anatomical knowledge for successful medical practice.<sup>[1]</sup>

Among the various anatomical concepts described in Ayurvedic literature, *Kurcha* holds a unique position. The term Kurcha denotes a brush-like arrangement formed by the union of Snayu and Dhamani, providing stability and functional support to specific regions of the body.<sup>[2]</sup> Classical texts enumerate six Kurcha structures located in the hands, feet, neck, and genital region.<sup>[3]</sup> Pada Kurcha, situated in the foot, plays a vital role in weight bearing, locomotion, and maintenance of posture.

In contemporary anatomy, the plantar aponeurosis is a dense fibrous structure forming the central support of the sole. It maintains the longitudinal arch of the foot and protects underlying neurovascular structures.<sup>[4]</sup> Clinically, prolonged mechanical stress over the plantar aponeurosis results in microtrauma, degeneration, and inflammation, commonly manifesting as plantar fasciitis.<sup>[5]</sup>

Long-term standing is an unavoidable occupational requirement for many professionals, including healthcare workers, traffic police, factory workers, farmers, retail workers, and homemakers. Continuous loading of the foot during prolonged standing alters plantar biomechanics, predisposing individuals to structural damage of the plantar fascia. Despite the high prevalence of foot pain among such professionals, limited studies have explored the Ayurvedic anatomical perspective of these changes.

Therefore, the present study was designed to evaluate anatomical changes in Pada Kurcha

due to long-term standing professions and to establish a correlation between classical Ayurvedic descriptions and modern anatomical findings.

## **AIMS AND OBJECTIVES**

### **Aim**

To assess anatomical changes occurring in Pada Kurcha due to long-term standing professions.

### **Objectives**

1. To study the anatomical concept of Pada Kurcha as described in Ayurvedic literature.
2. To correlate Pada Kurcha with the plantar aponeurosis in modern anatomy.
3. To evaluate postural and structural changes in individuals engaged in prolonged standing.
4. To assess plantar fascia changes using ultrasonography.

## **REVIEW OF LITERATURE**

### **Ayurvedic Concept of Kurcha**

According to Acharya Sushruta, Kurcha is formed by the compact arrangement of Snayu and Dhamani, resembling the structure of a broom.<sup>[3]</sup> Dalhana explains that the brush-like configuration provides strength and stability to regions subjected to mechanical stress.<sup>[6]</sup> Pada Kurcha is one of the five Marmas located in the foot region, highlighting its vital functional importance.<sup>[7]</sup>

The Sanskrit meaning of Kurcha refers to a bundle of fibers held together, suggesting a fibrous anatomical structure.<sup>[8]</sup> This description aligns closely with the anatomical characteristics of aponeuroses described in modern science.

### **Pada Sharir in Ayurveda**

Pada is considered a Karmendriya and Pratyanga, essential for locomotion and postural balance.<sup>[9]</sup> Classical texts describe detailed anatomical components of the foot, including Asthi, Sandhi, Snayu, Kandara, and Marma.<sup>[10]</sup> Any injury or dysfunction of these structures results in pain, instability, and impaired gait.

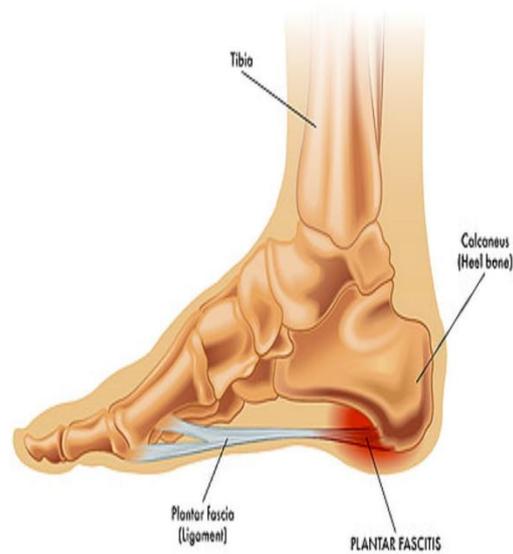
### **Modern Anatomy of the Plantar Aponeurosis**

The plantar aponeurosis is a thickened part of the deep fascia of the foot, extending from the medial tubercle of the calcaneus to the toes.<sup>[11]</sup> It divides into five slips, supports the medial longitudinal arch, and distributes plantar pressure during standing and walking.<sup>[12]</sup>

Degenerative changes in the plantar fascia are commonly observed in individuals exposed to repetitive loading, leading to plantar fasciitis, calcaneal spur formation, and arch collapse.<sup>[13]</sup>



**Fig No. 1 Plantar Aponeurosis.**



**Fig No.2 Planter Fasciitis.**

### **Plantar Fasciitis and Occupational Stress**

Plantar fasciitis affects nearly 10% of the population at some stage of life.<sup>[14]</sup> Prolonged standing, obesity, poor footwear, and biomechanical abnormalities are major risk factors.<sup>[15]</sup> Histopathological studies reveal collagen degeneration rather than acute inflammation, indicating a chronic degenerative process.<sup>[16]</sup>

### **Windlass Test**



**Fig. No. 3,4: Windlass test performing in volunteers.**

Windlass test is a clinical examination used to assess the integrity and functionality of the plantar fascia, particularly in diagnosing plantar fasciitis.

## MATERIALS AND METHODS

### Study Design

A cross-sectional observational study was conducted in two phases:

- **Phase A:** Literary review of Ayurvedic and modern anatomical texts
- **Phase B:** Cadaveric and clinical observational study

### Study Sample

A total of 100 subjects aged 30–60 years engaged in long-term standing professions (4–8 hours daily) were selected.

### Inclusion Criteria

- Individuals involved in prolonged standing
- Both sexes
- Willing to participate

### Exclusion Criteria

- Congenital foot deformities
- History of fractures or neurological disorders
- Diabetic foot or vascular diseases

### Assessment Parameters

- Subjective symptoms: pain, stiffness, tenderness, swelling
- Objective parameters: plantar fascia thickness, echogenicity, tears (assessed by USG)

## OBSERVATIONS AND RESULTS

The majority of participants reported moderate to severe heel pain and stiffness. Ultrasonographic evaluation revealed:

- Increased plantar fascia thickness (>5 mm) in 62% of subjects
- Hypoechoic changes indicating degeneration in 48%
- Partial tears in 18% of cases

These findings indicate progressive structural changes associated with prolonged standing.



**Fig. No. 5: Ultrasonography of Planter Fasciitis.**

## DISCUSSION

The structural and functional attributes of Pada Kurcha described in Ayurvedic texts closely resemble the plantar aponeurosis of modern anatomy. Long-term standing exerts repetitive stress on this fibrous structure, leading to microtrauma and degeneration. From an Ayurvedic perspective, this can be understood as Kurcha Dushti resulting from Vata Prakopa due to excessive strain and improper postural habits.

The findings of increased thickness and hypo echogenicity support the concept of chronic degeneration rather than acute inflammation, aligning with both Ayurvedic and modern views. The involvement of Pada Kurcha Marma explains the severity of pain and functional impairment observed clinically.

## CONCLUSION

The present study confirms that long-term standing professions significantly influence the structural integrity of Pada Kurcha. Anatomical and ultrasonographic findings demonstrate clear degenerative changes in the plantar aponeurosis, validating its correlation with the Ayurvedic concept of Pada Kurcha. Early identification and preventive measures such as ergonomic footwear, rest intervals, and lifestyle modifications can reduce occupational foot disorders.

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