ORIGINAL RESEARCH PAPER

Volume-8 | Issue-8 | August - 2019 | PRINT ISSN No. 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

AN OUTLOOK OF PADA SHARIR FROM AYURVEDIC AND MODERN PROSPECTIVE.

Ayurveda

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ABSTRACT

In Ayurveda Pada terminology has come in various contexts like it is one of the shadanga ,it is one of the indriya i.e.karmeindriya. it is one of the pratyanga. In embryonic life during monthwise development of garbha panchapindka are formed out of that pada is one of the pindka. From rachanatmak prospective pada have various entity related with it like number of asthi,sandhi, snayu,peshi,kurcha. The knowledge of foot anatomy is essential for therapeutic as well as diagnostic purpose. While describing longetivity measurement of pratyangas plays key role. If it resembles to prestated value then the person is considered as deerghayu. Sarata parikshan is also one of the parikshya bhav to determine longetivity in which various measurements of pratyangas are taken. Hence Pada sharir has its significance in Ayurvedic and modern prospective.

KEYWORDS

INTRODUCTION

In modern science foot is also called as the distal portion of leg, upon which an individual stands and walks; in human the tarsus, metatarsus, phalanges, and the surrounding tissue.[1] In ayurveda anterior portion of pada is called as prapadam or padagram. Pada, pad, angrhi, charana are synonyms of pada. Parshni is situated inferior to gulpha portion of a pada which is also root of pada of both men and women. It is also called as posterior portion of pada.[2]

Bones described by Charaka for pada- anguli are 30 and for pada-shalaka are 10.[3] Same description is given by Sushruta for number of Pada anguli. Next charaka has described the bones of pada adhisthana as 2 and of Parshni- 2, Gulpha-4 . Sushruta has quoted number of bones as 10 of tala, kurcha and gulpha region.[4] According to Kashyapa parshni are 2 in number.[5] The number of Parshni is also same as per Sushruta. The Parshni region denotes the heel region.

Pada is considered as one of the karmeindriaya[6]. During the 2nd month of intra embryonic life pancha pindka is formed i.e.hast,pada, shira.[7] According to Sushruta pada is one of the part of shadanga sharir.[8]

There are 16 kandara out of these 4 are present in foot region.[9] Also out of six kurcha two are present in pada region.[10] Out of 17 sandhi in limb region 12 are present in 4 phalanges,2in thumb,1 each in janu,nitamb, vankshan so total are 17 sandhi are present in each lower limb.[11]

In each limb there are 150 snayu,out of that 30 snayu are present in all toes each toe having 6 snayu . 30 are present in tala,kurcha,gulpha region.[12]

In Pada Kshipra, Talahriday, Kurcha, Kurchashira,Gulpha marma are present.[13]

Whereas modern science describes 28 phalanges, 10 metatarsus,14 tarsus in the both feet. The skeleton of foot has seven tarsal bones comprising two rows. The Proximal row consists of talus and calcaneus. The distal row consists of three cuneiform and cuboid. The navicular bone is situated in between two rows. Calcaneum is largest tarsal bone. The metarsal bones are five in number which are numbered from medial to lateral. Phalanges are fourteen in number. In each toe three phalanges are present except great toe which has two phalanges.

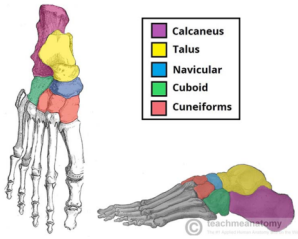

Figure 1 Skeleton of foot

The anatomy of foot comprises first of all nerve supply of foot. The sensory nerve supply of dorsum of foot is derived from superficial peroneal nerve, assisted by deep peroneal, saphenous, & sural nerves. The dorsalis pedis artery runs forward on dorsum of foot. It is continuation of anterior tibial artery . At the proximal end of the first interosseous space, the artery turns towards the sole between the two heads of the first dorsal interosseous muscle to anastomose with the end of the planter arch. It has medial and lateral tarsal artery,arcuate artery, 1st dorsal and planter metatarsal artery as branches of doraslis pedis artery. The muscle present on dorsum of foot is extensor digitorum brevis. The skin of sole of foot is thik and hairless. It is firmly bound down to the underlying deep fascia by numerous fibrous bands. The sensory nerve supply of skin of foot is medial calcaneal branch of tibial nerve, medial and lateral planter nerve. The planter aponeurosis is thickened band of deep fascia in the sole of foot. It protects the underlying nerve and vessels and also maintain longitudinal arch of foot. The muscle of foot is described in four layers from superior to inferior. The first layer comprises abductor hallucis, flexor digitorum brevis, abductor digiti minimi. The second layer consist of lumbricals, flexor hallucis longus and flexor digitorum longus tendon, quadrates plantae. The third layer has flexor hallucis brevis, adductor hallucis, flexor digiti minimi brevis muscles. Interossei and tendons of tibialis posterior and peroneus longus are muscles of fourth layer. The chief function of sole of foot is to maintain arches of foot.

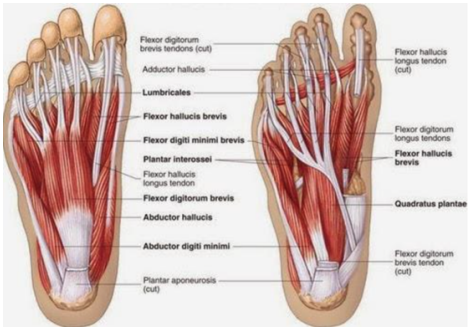

Figure 2 Muscles of Foot

The calcaneus is the largest of the tarsal bones and projects posterior to the tibia and fibula as a short lever for muscles of the calf attached to its posterior surface. It is irregularly cuboidal, its long axis being inclined distally upwards and laterally. It has a relatively thin cortex (Daftary et al 2005). The superior or proximal surface is divisible into three areas. The posterior third is rough and concavoconvex; the convexity is transverse and supports fibroadipose tissue (Kager's fat pad) between the calcaneal tendon and ankle joint. The middle third carries the posterior talar facet, which is oval and convex anteroposteriorly. The anterior third is partly articular; distal (anterior) to the posterior

articular facet, a rough depression, the calcaneal sulcus, narrows into a groove on the medial side and completes the tarsal sinus with the talus. (The tarsal sinus is a conical hollow bounded by the talus medially, superiorly and laterally, with the superior surface of the calcaneus below. Its medial end is narrow and tunnel shaped, and is often referred to as the tarsal canal.) Distal and medial to this groove, an elongated articular area covers the sustentaculum tali (talar shelf) and extends distolaterally on the body of the bone. This facet is often divided into middle and anterior talar facets by a nonarticular interval at the anterior limit of the sustentaculum tali (the incidence of this subdivision varies with sex, race and occupation). Rarely, all three facets on the upper surface of the calcaneus are fused into one irregular area. The anterior surface is the smallest, and is an obliquely set concavoconvex articular facet for the cuboid. The posterior surface is divided into three regions: a smooth proximal (superior) area separated from the calcaneal tendon by a bursa and adipose tissue; a middle area, which is the largest, limited above by a groove and below by a rough ridge for the calcaneal tendon; and a distal (inferior) area, vertically striated and inclined downwards and forwards, which is the subcutaneous weightbearing surface. The plantar surface is rough, especially proximally as the calcaneal tuberosity, the lateral and medial processes of which extend distally, separated by a notch. The medial process is longer and broader . Further distally, an anterior tubercle marks the distal limit of the attachment of the long plantar ligament. The lateral surface is almost flat. It is proximally deeper and palpable on the lateral aspect of the heel distal to the lateral malleolus. Distally, it presents the fibular trochlea ,which is exceedingly variable in size and palpable 2 cm distal to the lateral malleolus when well developed. It bears an oblique groove for the tendon of fibularis longus and a shallower proximal groove for the tendon of fibularis brevis. About 1 cm or more behind and above the fibular trochlea, a second elevation may exist for attachment of the calcaneofibular part of the lateral ligament. The medial surface is vertically concave, and its concavity is accentuated by the sustentaculum tali, which projects medially from the distal part of its upper border superiorly the process bears the middle talar facets and inferiorly a groove, which is continuous with that on the talar posterior surface for the tendon of flexor hallucis longus .The medial aspect of the sustentaculum tali, this accessory bone is occasionally found and arises from a separate ossification centre that appears between 8 and 11 years of age. When the os trigonum fuses to the posterolateral process of the talus it is called the trigonal process (Stieda's process). Another accessory bone (although rare) of the foot is the os supratalare, which lies on the dorsal aspect of the talus; it rarely measures more than 4 mm in length. A detailed analysis of patterns of anterior talar articular facets in a series of 401 Indian calcanei revealed four types. Type I (67%) showed one continuous facet on the sustentaculum extending to the distomedial calcaneal corner; type II (26%) presented two facets, one sustentacular and one distal calcaneal; type III (5%) possessed only a single sustentacular facet; and type IV (2%) showed confluent anterior and posterior facets (Gupta et al 1977).[14]

The calcaneus is well designed to sustain high tensile, bending, and compressive forces. The major neurovascular structures are located medially and are well insulated by the medial soft tissues. These structures are at risk, however, during medial approaches to the calcaneus. Laterally, there are several bony landmarks that are palpable primarily because of the relative paucity of the soft-tissue elements. Lateral approaches to the calcaneus have been associated with the areas of skin necrosis that may be related to the arterial anatomy. The calcaneus has four articular surfaces. The congruity of these articular surfaces and their relationship to one another can be assessed roentgenographically.[15]

CONCLUSION-

The knowledge of Pada sharir is of paramount importance from Ayurvedic and modern aspect in evaluating various clinical conditions and interpreting the radiological images which plays key role in treatment.

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