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An Anatomical Exploration of *Kukundra Marma*

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Abstract: Out of 107 Marma, Kukundar Marma is one that is classified as Vaikalyakara Marma and is situated on the Parshava Bhirbhage (dorso-lateral region of the pelvis) and Pristhvansa Ubhayato (both sides of the vertebral column). Injury to the Kukundar Marma causes lower limb paralysis and a lack of feeling. It belongs to the category of Sandhi Marma and is intimately related to the sacroiliac joint. The majority of Kukundar Marma Aghatjanya Lakshana resembles sciatic nerve damage and lumbosacral plexopathy. Marma aghat lakshans can serve in this situation as predictors of the structures in question. This study used cadaveric research to determine the precise location of the Kukundar Marma and its relationship to other anatomical entities (in its circumference). The study concludes as a result.
Keywords: Marma, Kukundar, lumbosacral plexopathy, Sciatic Nerve, Chestanasha, Gluteal Artery.

I. INTRODUCTION

Marma Sharir is a science of essential anatomical places that has been developed to aid in *Ayurvedic* surgery. The combination of *Mamsa, Sira, Snayu, Asthi,* and *Sandhi* is known as *Marma.* It is they who seats of the *parana,* any damage to them causes serious difficulties, serious anguish or demise. These mas have been classified by *Acharya Sushruta*.ln accordance with the *Shadang* distribution in order to make things simple knowing where they are, such as *Sakthi gata* (limbs), *vaksha*(back), *urdhava jatru* (thoracic), *udar* (abdominal), and *prishtha gata* (above the clavicular level). There are 14 *Prishthagata Marmas* in number, with upper division and lower division for each of these *Acharya Ghanekar's* division The upper division' s are *Brihati,* while the bottom level has *katiktarun* and *amsaphalak,* the Marmas of *Kukundar, Nitamb,* and *Parshvasandhi*.Lower division Marma are difficult to access since they are situated in the gluteal area or the pelvic cavity. both the pelvic and the gluteal area enables the passage of important blood vessels and nerves. providing for lower limbs, and any injury might lead to lasting deficiency or serious issues that might endanger life.

Kukundar Marma is one of the lowest divisions of the body and is *Vaikalyakara* in nature (causes deformities when acted upon). It is located at the back of humans, or *Pristha,* on the outside of the *Jaghana,* or pelvic bone and two in quantity. Injury to *Kukundar Marma* results in loss of sensation and paraparesis. Depending on the length of the damage and its severity, the handicap brought on by this *marma* may last a lifetime. Many writers have claimed the anatomical position of *Kukundar Marma* being in between sacroiliac joint and ischial tuberosity. The major nerves related to this area are lumbar and sacral plexus. Most of the *Kukundar Marma Aghatjanya Lakshana* has a resemblance with lumbosacral plexopathy and sciatic nerve injury. Since sciatic nerve is rather large nerve with multiple root values, therefore the *marma* can be located anywhere ranging from its root value up to its extent at ischial tuberosity. Mostly trauma caused by a pelvic fracture or acetabular fracture is the major causes of nerve plexopathy at the given area. Eighty percent of all nerve injuries following pelvic trauma are lumbar plexopathy. The dura attachments, the lumbosacral plexus's nerve traction locations connective tissues that link to the anterior sacroiliac joint and sacral ala joint. Therefore, a thorough anatomical investigation of the sacroiliac joint and It is done to rule out where the marma is by looking at the related nerve plexus. and every anatomical feature that contributes to its *Aghatjanya lakshanas.*

II. MATERIALS AND METHODS

A. Conceptual Analysis

The word *Kukundara* is derived from the word *Kundara* which is prefixed by the word *Ku*. *Ku* means earth and *Kundara* means small depression or pit.

B. Kukundara Word

Acharya Sushruta has described that *Kukundara Marma* are present in the two flanks, on the outer side of the buttocks on the sides of the vertebral column; and injury to this produce loss of sensation and function of the lower part of the body.
These are *vaikalyakara* and *ardhaangula* in *praman* in nature.

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C. Classification of Kukundar Marma

According to *Pariman*	According to *Rachana*	According to *Aghataja Parinama*
Ardhangulpraman	*Sandhimarma*	*Vaikalyakarmarma*

D. Kukundar Marma As Per Writers

Dr. D. G Thatte	Dr. S. K. Joshi	Dr. Ghanekar
Ischial tuberosity	Sacroiliac joint	Ischial tuberosity

III. CADAVERIC STUDY

Anatomy around sacroiliac joint.

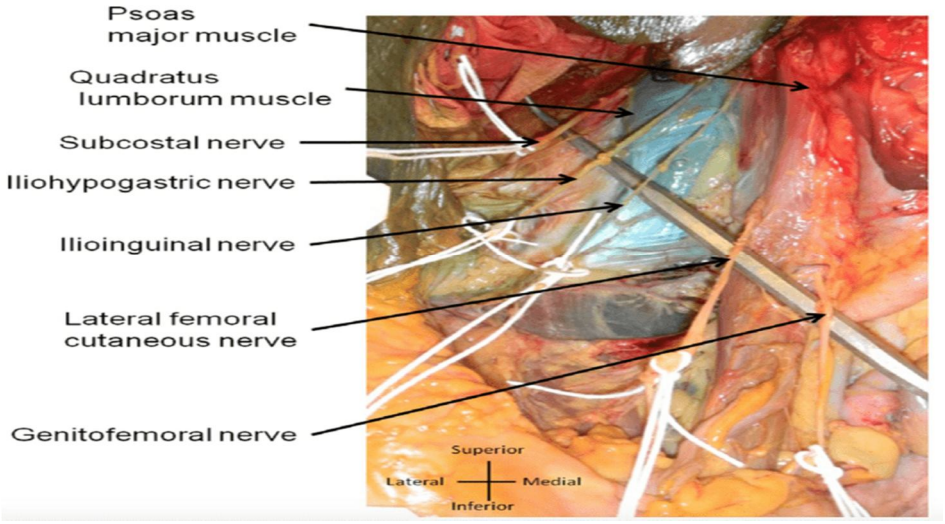
A. Posterior Portion

1) Fascia: Superficial and deep lamina of thoracolumbar fascia.
2) Ligaments: Joint capsule, long dorsal ligament (originates from PSIS), STL &SSL, iliolumbar ligaments. Muscle - Gluteus maximus (lateral), piriformis(lateral) muscle, Coccygeus (lateral margin of sacrum).
3) Blood Vessels: Superior gluteal artery (below and lateral to inferior margin).
4) Nerves: Superior and inferior gluteal nerve.

B. Anterior Portion

1) Muscle: Psoas major-anterior to joint. Cranial insertion of obturator internus
2) Ligaments: Superiorly- ilio-lumbar ligaments, anterior sacroiliac ligament (in between ventral surface of the sacral alar and ilium). Ventral sacroiliac capsule blends with Sacrospinus ligament.
3) Blood Vessels: Iliac artery and vein immediately anterior to psoas. major, iliolumbar artery, sacral artery.
4) Nerves: Branches of lumber plexus are found after retraction of p. major. Lumbosacral trunk-in between psoas. major and obturator internus, closely related to ventral Sacroiliac Joint ligament.

During dissection we found that the dorsal portion of sacroiliac joint is covered with complex of ligaments including long and short dorsal sacroiliac ligament and iliolumbar ligament. The lateral part of long dorsal ligament is continuous with the fibres of sacrotuberous ligament.it has been found that the dorsal fascia of the piriformis is continuous with sacrotuberous ligament. The gluteus maximus is strongly connected and fused with sacrotuberous ligament and Sacrospinus ligament. After removing the muscle these ligaments become visible. The superior gluteal artery passes posteriorly between the lumbosacral trunk and the 1st sacral nerve.



IV. DISCUSSION

Kukundar Marma, according to acharyas, is situated on "*Pristhvans aubhya to*" (both sides of the spine) and "*Parshvajaghanabhirbhage"* (dorso-later part of pelvic bone). It is categorised as *sandhi marma*, with the sacroiliac joint being located in the dorsal part and bilateral to the vertebral column. This joint, which extends from the S1, S2, and S3 sacral segments, is closely connected to the lumbosacral trunk. The lumbosacral trunk is the anatomical component that is closest to the sacrum, separating from the anterior surface periosteum. L4 and five L5 vertebrae combine to produce the lumbar portion of the lumbosacral trunk. 2 cm below the pelvic brim, it crosses the sacroiliac joint. It is the primary plexus that innervates the lower body. The L5 nerve root exits inferior to the lumbosacral ligament and is fixed to the anterior superior sacral ala. Lumbosacral trunk is covered throughout its course by the psoas muscle, except at its terminal part near the bony pelvic rim where it is joined by the S1 root. Any trauma to sacroiliac joint (fracture or dislocation) will most likely result in an L5 nerve root injury and affliction of lumbosacral plexus resulting in lumbosacral plexopathy which accounts for 80% of all nerve injuries after pelvic trauma. The lumbosacral trunk gives its branches to sciatic nerve (L4, L5, S1, S2, S3), superior (L4, L5-S1) & inferior gluteal (L5-S1, S2) nerves, nerve to obturator internus (L5-S1, S2), nerve to quadratus femoris (L4, L5-S1). All these structures emerges from pelvic cavity to supply gluteal surface through sciatic foramen, it is a nearly round cavity present at the dorsum of iliac bone. And *Kukundar* word itself means a round cavity or pit, which states that this marma should be located near a round shaped pit. Injury to *Kukundar Marma* results in loss of sensation and movement of lower limb.

Injury to the lumbosacral trunk causes foot drop, fluctuating buttock discomfort, and numbness in the dorsum of the foot and the lateral leg. Neurological findings include more than only ankle and toe weakness. ankle eversion and dorsiflexion, as well as ankle inversion and toe flexion. The gluteus maximus and hamstrings both exhibit varying degrees of weakness muscles. Ankle jerk and plantar flexion are often normal. Sensory loss is in the L5 dermatomal distribution. Identifying ankle sensitivity flexion (flexor digitorum longus) or inversion (tibialis posterior), a peroneal neuropathy is eliminated.

The sacroiliac joint is a complex joint capable of small amount of movement. It has an auricular or C-shaped, L shaped configuration. It has a short cranial (more fibrous) and longer caudal limb (more synovial). It is present on both side of vertebral column and on dorsal aspect of gluteal region, the most closely situated soft tissue element is lumbosacral trunk, which is in close association with the lower part of the joint. Its trauma and lesions produce same effect as described in *kukundar marma aghat lakshans.*

Kukundar marma is ardhangul in praman but the average auricular area of Sacroiliac joint is far greater than the marma expansion. But *Acharya Dalhan* has said that *Kukundar marma* is slightly (deep) in its position, so taking his interpretation in consideration up to the depth of 1cm from inferior point of sacroiliac joint as well as circumference of the area, which is in close association with greater sciatic foramen (a round cavity) was taken in account for the position of kukundar marma. 1 cm circumference covers the ligamentous area of dorsal sacroiliac joint. As the lateral expansion of long dorsal ligament, directly caudal to the PSIS ranges between 15 -30 mm. while a depth of 1 cm corresponds the site where lumbosacral trunk lies and joints with S1 nerve root just below the inferior border of Sacroiliac joint. The lumbosacral trunk joints the sacral plexus anterior to the piriformis muscle to form the sciatic nerve. So, inferior part of sacroiliac joint (both deep and circumference) might be the site of *Kukundar Marma.*

V. CONCLUSION

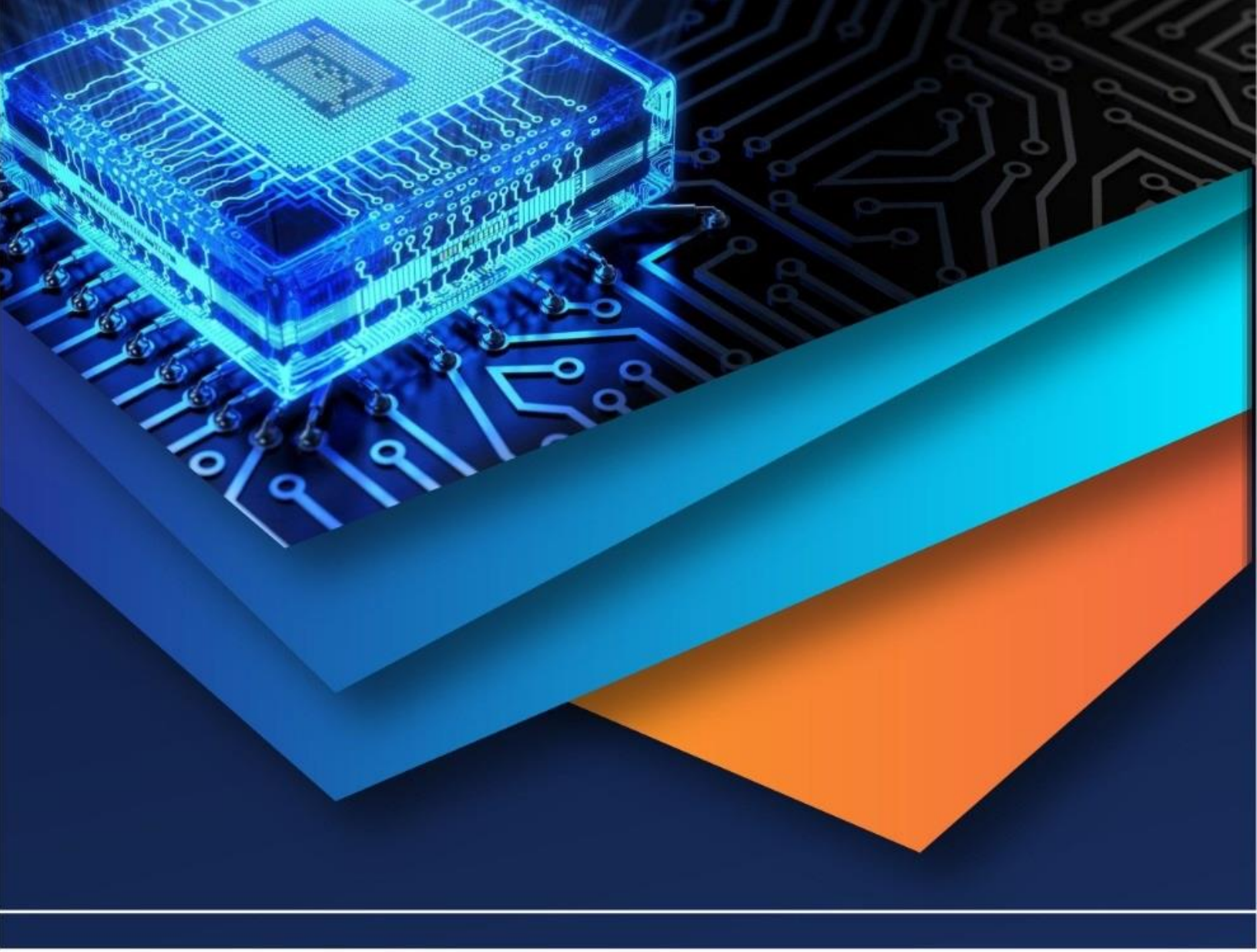
The word *Kukundar* is derived from the word *Kundara* which is prefixed by the word *Ku. Ku* means earth *Kundara* means small depression or pit. *Kukundara marma* is categorized under *Sandhi Marma* situated on both sides of the vertebral column on the dorso-lateral aspect of pelvic bone. Dorsal-sacroiliac connection is similar to Marma's placement and region. The larger sciatic foramina were discovered to resemble a round pit during cadaveric dissection, and most of the important nerves and vessels emerge from this foramen. Dorsal-sacroiliac connection is similar to Marma's placement and region. The superior border of sciatic foramen is continuous with the inferior margin of dorsal sacroiliac joint. Adhokaya Chestanasha (paraparesis) and Saparshhani (loss of sensation), which are best seen when neurological structures are disrupted, are the two *Kukundar Marma Aghat Lakshanas.* Scroiliac joint-related tissues are damaged. Therefore, it said that *Kukundar Marma* may be located in the inferior sacroiliac joint.

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