

## Ossified Sacrotuberous Ligament and its Clinical Significance: A Case Report

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### Abstract

The present study describes the morphometry of a unilateral ossified sacrotuberous ligament. It aims to discuss its anatomical and clinical implications. The pudendal nerve, internal pudendal artery, nerve to obturator internus and coccygeal branch of inferior gluteal artery, are the important structures related to sacrotuberous ligament. An ossified sacrotuberous ligament may be an important etiological factor in neurovascular compression syndromes and its anatomical knowledge may help in the development of new treatment strategy for this common clinical problem.

The ossified sacrotuberous ligament in the present case exhibits, a characteristic anterior and posterior segment, a base at the ischial tuberosity and an apex attached to alae of sacrum. The ossified sacrotuberous ligament may be important in differential diagnosis of soft tissue pain and tenderness after trauma. It may be a challenging puzzle for the present day surgeon and radiologist in interpretation of radiological problems.

**Key Words:** Ischial tuberosity, Neurovascular compression, Sacrotuberous ligament, Surgeon.

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## 1- INTRODUCTION

Ligaments are tough, flexible and pliant fibrous bands which connect the bones. Hence the sacroiliac ligament forms an integral part of the sacroiliac joint. The sacrotuberous ligament (posterior sacrosiatic ligament) is located in lower or posterior part of pelvis. It is flat and triangular in form, narrower in the middle than at the ends. It morphologically represents the degenerated part of Biceps Femoris muscle. The pudendal nerve, internal pudendal artery, nerve to obturator internus and coccygeal branch of inferior gluteal artery are the crucial structures around the sacrotuberous ligament. The sacrotuberous ligament passes from ischial tuberosity to the ilium, sacrum and coccyx transforming the sciatic notch into a large sciatic foramen, which is further subdivided by the sacrospinous ligament.

It is slender fan shaped ligament of the posterior pelvis located on the either side of the body. Sacrotuberous ligament is an important part connecting the pelvic bone to the vertebral column; it maintains the stability of the joint and transmits weight (1). The sacrotuberous ligament extends from the lower part of sacrum and upper coccyx to the base or lower margin and medial part of ischial tuberosity. The sacrotuberous ligament is well developed at ischial tuberosity. By 28th week of fetal life the ligament seems to connect between the gluteus maximus and the tuberosity. At 38th week, the intramuscular tendon of coccygeus muscle gets connected with the growing sacrotuberous ligament (2).

In contrast, the sacrospinous ligament is much weaker than the sacrotuberous ligament, although both are considered critical for stabilising the sacroiliac joint. The sacrotuberous ligament is an extrinsic type of ligament. The association of long head of biceps femoris and sacrotuberous ligament is well established but it is only partial (3). Sacrotuberous ligament

consists of many collagen fibres giving support and strength to the sacrum and maintains movements under the transmission of body weight from trunk to lower extremities. The lower border of ligament was found to be directly continuous with the tendon of long head of biceps femoris. Biceps femoris could therefore act to stabilise the sacroiliac joint via sacrotuberous ligament. The bottom of the sacrotuberous ligament connects to the thoracolumbar fascia that further connects into multifidus and erector spinae. It plays a very important role in walking and running (4).

An ossified sacrotuberous ligament may be a significant factor in differential diagnosis of soft tissue pain and tenderness after trauma (5); in an ossified sacrotuberous ligament, the pudendal nerve may get entrapped between the sacrotuberous and sacrospinous ligament, which is the intraligamentous space of these ligaments, causing chronic perineal pain. The sacrotuberous ligament is surgically removed to relieve the pain and it is an essential factor in undiagnosed chronic perineal pain (6). The knowledge regarding the ossified sacrotuberous ligament may be helpful for clinicians who undergo orthopaedic surgery to deal with neurovascular compression syndrome (7).

## 2- CASE REPORT

During a routine osteological study the undergraduate medical students in the Department of Anatomy of Saveetha Medical College, Kuthambakkam, India, observed an unusual variation of ossified sacrotuberous ligament in an articulated pelvis on the right side however the other side was normal. After our observations, we measured the thickness and length of the ossified sacrotuberous ligament by using digital vernier caliper. Photographs were taken and their values were tabulated (**Table.1**).

**Table-1:** The measurements of ossified sacrotuberous ligament.

Ligament	Length of Ligament	Thickness of Ligament	
Ossified Sacrotuberous Ligament	10.2cm	Proximal	15mm
		Middle	10mm
		Distal	12mm

### 3- DISCUSSION

The sacrotuberous ligament is intimately associated with a variety of ligaments and muscles. Each of these structures may interact with the ligament differently and affect its functions. The sacrotuberous ligament is clearly a significant component in joining the myofascial trains of the lower extremities to the upper body (8). The sacrotuberous ligament is considered to be the phylogenetically degenerated tendon of origin of long head of Biceps femoris. The fibres of sacrotuberous ligament passes obliquely downwards forward laterally, and become narrow, as it reaches the ischial tuberosity **Figure.1**.

It prolongs along inner margin of ischial ramus as a sickle shaped extension called falciform process, it also prevents the posterior rotation of ilium and sacrum. During childbirth, the ligament becomes flexible, making a way for the sacrum to shift outwards, and also makes a path for the fetus. In standing, the body weight transmitted on to the sacrum may cause anterior tilt of the sacrum. This is prevented by the stretch in the posterior sacroiliac joint along with the sacrotuberous ligament which acts an automatic locking device or home screw mechanism (8). The sacrotuberous ligament is very important for the maintenance of pelvic or sacral balance. The ligament gives attachment to the lowest fibres of Gluteus Maximus. Coccygeal branches of Inferior Gluteal artery and perforating cutaneous branches

of coccygeal plexus pierces the sacrotuberous ligament and supplies the Gluteus Maximus (9). The close relationship with the blood vessels and nerves suggest that this ligament may not be subjected to high loads, as heavily loaded structures are not commonly associated with the passage of neurovascular bundles. Ossification of sacrotuberous ligament is described as a slate pencil like formation, which begins at ischial tuberosity, projects into obturator foramen and has a caudocranial growth (10). Occurrence of bilateral ossification of sacrotuberous ligament is rare. Ossification is mostly seen in men and never seen in children, hence proving that it is an acquired lesion and not an epigenetic variation (11).

The apex of ossified sacrotuberous ligament was very irregular and showed many bony protuberances. Ossification of sacrotuberous ligament may lead to the compression of the vessels and subsequently result in ischemia of the area supplied by it. It is also involved in coccyx pain as it connects to the coccyx. There are three possible sites where the pudendal nerve may get entrapped between sacrotuberous ligament and sacrospinous ligament, in the pudendal canal and by the falciform process of sacrotuberous ligaments (12). During the spinous ligament fixation procedures, ignorance of an ossified sacrotuberous ligament may pose unnecessary hindrance. The sacrotuberous ligament is partially fused and adherent with the sacrospinous ligament. The pudendal nerve is

the principle sensory nerve of external genitalia and perineum. Compression of pudendal nerve leads to fecal incontinence, numbness in the genitals, rectal pain, reduced awareness of an impending bowel

movement, disturbance of normal urination, altered sensation during ejaculation and urinary or bowel incontinence (10).



**Fig.1:** The picture shows ossified sacrotuberous ligament.

#### **4- CONCLUSION**

The Anatomical knowledge of the ossification of sacrotuberous ligament may be helpful for clinicians, radiologists and surgeons in handling with neurovascular compression syndromes involving structures in the immediate vicinity of sacrotuberous ligament. Awareness of such ossification of sacrotuberous ligament may be helpful for surgeons undertaking reconstructive procedure.

**5- CONFLICT OF INTEREST:** Note.

#### **6- ACKNOWLEDGMENT**

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