

# Bony spurs projecting in the obturator foramen

R. Singh

Department of Anatomy, CSM Medical University, Lucknow, UP, India

[Received 8 December 2011; Accepted 21 February 2012]

*The obturator foramen is large oval aperture in males or irregularly triangular aperture in females in the hipbone, situated anteroinferior to the acetabulum between the pubis and ischium. The dry bone under study is a male left sided hipbone. It contains the obturator groove through which the obturator nerve and vessels pass. During analysis of hipbones in the osteology laboratory of CSM Medical University Lucknow, UP, India, a hipbone was found in which bony spurs or exostoses were projecting from the margins into the obturator foramen. These bony projections in the obturator foramen constitute a new anatomical variant in the hipbone, as they have not been reported before. These bony spurs may impinge on the obturator nerve and vessels causing neurovascular complications and also trauma to the soft tissues during biomechanical movements. In addition, these bony spurs may cause spasms of the obturator internus and externus muscles, causing groin pain. These bony projections may also lead to misinterpretation of radiographs. Thus, knowledge of these bony spurs is of paramount importance to anatomists, surgeons, sport physicians, and radiologists. (Folia Morphol 2012; 71, 2: 125–127)*

**Key words:** hipbone, bony spur, obturator foramen, pubis, ischium

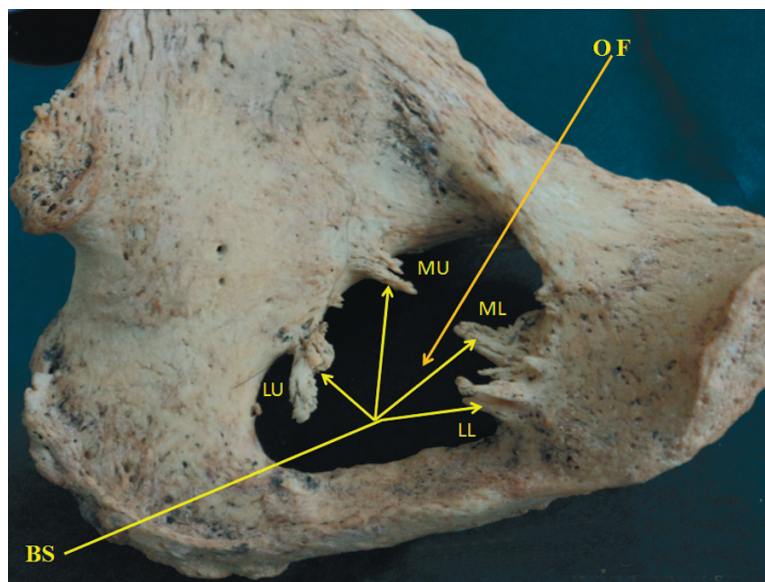
## INTRODUCTION

The obturator foramen is defined as a large oval or irregularly triangular opening in the hipbone anteroinferior to the acetabulum between the pubis and ischium. The shape of the obturator foramen is oval in males and triangular in females. The obturator foramen is covered by obturator membrane in normal anatomy. The left sided hipbone under study possessed an oval shaped obturator foramen and the ischiopubic rami was everted; therefore, it was a male hipbone. The obturator canal gives passage to the obturator nerve and vessels. The margins of the obturator foramen give rise to the obturator externus from the dorsal surface and the obturator internus from the pelvic surface. In the obturator canal the obturator artery and nerve divide into anterior and posterior divisions. These divisions of the artery form a circle over the obturator membrane.

Bony spurs detected projecting in the obturator foramen are a rare variant and unreported, so this was the first and only finding in the Indian population. There is no literature available on these bony projections. However, separate anomalies relating to the obturator foramen are reported as a double obturator foramen from an X-ray study [2] and as a triplicate obturator foramen [1] from a dry bone study. These exostoses provide new anatomical features to enhance knowledge, thus widening the anatomical field, and have a great deal of clinical implications; hence the study was carried out.

## CASE REPORT

During routine osteology demonstration classes of MBBS students of CSM Medical University, Lucknow, UP, India, a left sided male hipbone obtained from the osteology laboratory of the Department



**Figure 1.** Bony spurs; OF — obturator foramen; BS — bony spurs in obturator foramen; MU — medial upper bony outgrowth from upper margin of obturator foramen; LU — lateral upper bony outgrowth from upper margin of obturator foramen; ML — medial lower bony outgrowth from lower margin of obturator foramen; LL — lateral lower bony outgrowth from lower margin of obturator foramen.

of Anatomy was detected with bony spurs projecting from the margin of the obturator foramen.

Two bony spurs project from the superior margin (Fig. 1). The medial one is 1.5 cm from the obturator canal, and the distance between the two spurs is 1.2 cm. The length of the medial spur is 1 cm and that of the lateral spur is 1.6 cm. The medial spur is directed medially and downward, and the lateral one is directed downward and laterally. Two spurs project from the anteroinferior margin (Fig. 1). The medial spur is irregular and directed superiorly and its length is 1.2 cm, and the lateral one is directed slightly medially and its length is 0.7 cm. These bony spurs are detected in the left dry male hipbone, and the innominate bone is not associated with any other abnormality.

## DISCUSSION

The left-sided male dry hipbone under study possesses an oval shaped obturator foramen; therefore, it is a male hipbone. The obturator foramen is associated with the obturator canal. The obturator nerve and artery pass through the obturator canal where these structures divide into anterior and posterior divisions. The two divisions of the obturator artery form a circle over the obturator membrane [6]. Its margins on the pelvic and dorsal surfaces give origin to the obturator internus and obturator externus, respectively. Both of these muscles are short, lateral rotators of the thigh.

The study of a dry hipbone was taken up in this case. The bony spurs were observed projecting in the obturator foramen. The kinematics of biomechanical movements of the legs communicate stress to the lateral rotator muscles. These muscles, if pierced by bony spurs, may produce trauma and spasm to surrounding structures during movements, causing pain or other clinical complications.

### Probable causes of bony spurs

The situations in which a person leans towards the left during walking, playing, or other activities may cause additional stress on the lateral rotator muscles due to non-uniform distribution of weight of the body. In this situation, the short lateral rotators, particularly the obturator externus and obturator internus, are excessively used leading to micro trauma in the obturator muscles. This may cause tearing of the periosteum and activation of osteocytes. These osteocytes may lay down the bone resulting in exostoses or bony spurs. Similarly, the obturator membrane may ossify due to over stretching, giving rise to bony spurs. Moreover, the formation of bony spurs may be attributed to calcium metabolism disorders.

These bony spurs are more likely to occur in sportspersons due to their kinematic and biomechanical activities. Apart from this, exostoses may

also be caused in pathological conditions like polio, dislocation of the hip joint, and paralysis of the gluteus maximus and minimus.

As it is a dry bone laboratory work, no family history of the bone holder can be obtained. No literature genetic or embryological study is available. Therefore, the theory of genetic cause is not understood.

#### **The clinical significance of bony spurs**

These bony spurs may impinge the obturator nerve and vessels leading to neurovascular complications when subjected to kinematics or biomechanical movements of the left leg. Besides neurovascular complications, these bony spurs may lead to groin pain and spasm of the obturator internus and externus muscles. Pubalgia observed in sportspersons [4] may also be related to these bony spurs. Groin pain occurs due to involvement of flexors and adductors in sports such as sprinting and base stealing in baseball [3], and bony spurs may be a possible cause of this pain. The obturator region has been used for cystocele repair by a synthetic vaginal mesh, which is secured anteriorly through the obturator foramen [7]. This region is also a route for the management of short-pedicle undescended testicles [5]. The bony spurs present in the obturator foramen may interfere with cystocele repair and management of short-pedicle undescended testicles if the surgeon is unaware of the presence of bony spurs. There is also a chance of misdiagnosis of pain in patients by a physician/surgeon if exostoses are an unknown fact. The in-

formation may be of use to anthropologists to identify sportspersons and individuals suffering from polio or if there is paralysis of the gluteus medius and minimus or dislocation of the hip joint, as bony spurs in the obturator foramen are formed in these conditions. Pelvic osteotomy also requires prior anatomical knowledge of the obturator foramen. Bony spurs may also lead to misinterpretation of radiographs. Thus, knowledge of these bony spurs is of paramount importance to anatomists for new variants, neurosurgeons, sports physicians, anthropologists, and radiologists.

#### **REFERENCES**

1. Das S, Suri R, Kapur V (2006) A triplicate obturator foramen. *Folia Morphol*, 65: 164–166.
2. Karantanis A, Velesiotou K, Sakellariou E (2002) Double obturator foramen. *Am J Roentgenol*, 178: 245.
3. Moore KL, Dalley AF, Agur Anne MR (2010) Clinically oriented anatomy. 6<sup>th</sup> Ed. Lippincott Williams and Wilkins, Baltimore.
4. Omar Imran M, Zogra Adam C, Kavanagh Eoin C, Koulouris G, Meyers WC (2008) Athletic pubalgia and sports hernia: optimal MRI technique and findings. *Radiographics*, 28: 1415–1438.
5. Shafik A (1982) Obturator foramen approach II. A new surgical approach for management of short-pedicle undescended testicles. *Am J Surg*, 144: 381–384.
6. William PL, Bannister LH, Berry MM, Collins P, Dyson M, Dussek JE, Ferguson MWJ (1995) Gray's anatomy. 38<sup>th</sup> Ed. Churchill Livingstone, Edinburgh.
7. Yan A, Anne M, Karine A, Vanessa F, Christophe P, Anne T, Patrick M (2004) Cystocele repairing by a synthetic vaginal mesh secured anteriorly through the obturator foramen. *Eur J Obstet Gynecol Reprod Biol*, 115: 90–94.