

Bilateral Sacroiliac Joint Fusion: A Case Report

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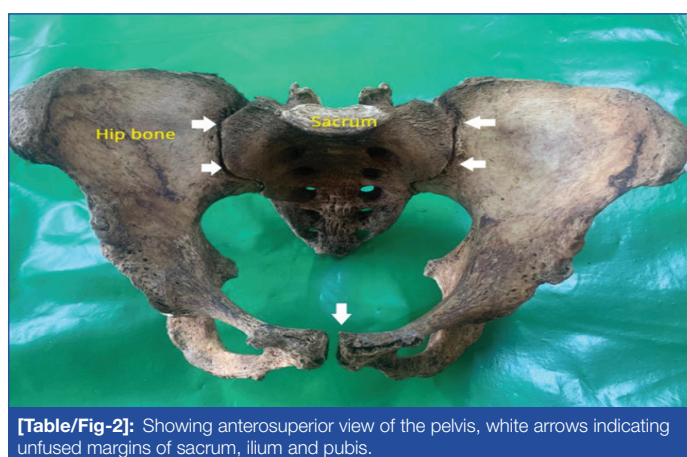
ABSTRACT

Sacroiliac (SI) joint is the articulation which forms the part of the bony pelvis. It plays an important role in locomotor activity, and childbirth during labour. It helps in the transmission and distribution of axial body weight from the spine to the pelvis. This synovial joint exhibit limited gliding movements within the joint cavity. About 15-30% of low backache aetiologies are attributed to SI joint dysfunction. People who are overweight, have co-morbid conditions, and pregnant women are at higher risk of developing vertebral joint deformities called spondylarthropathies. They are group of inflammatory disorders which are involving the vertebral spines and peripheral joints, where the symptom of stiffness is prominently seen. The anatomical variations in the SI joint morphology like accessory SI joint, iliosacral complex and sacral defect, dimorphic joint, are of compelling interest concerning SI joint pathologies from the orthopaedic viewpoint. This case report presents a bilateral fusion of SI joint, found in a skeleton in the museum of medical college.

Keywords: Ankylosing spondylitis, Pelvis, Spondylarthropathy

CASE REPORT

In the museum bone bank of Department of Anatomy, JSS Medical College, Mysuru, Karnataka, India, a unique articulated pelvis was found. In that bony pelvis, on the right SI joint there was a complete fusion of inner lip and ventral surface of posterior most segment of iliac crest including both posterosuperior and posteroinferior iliac spine with the corresponding articular surface of sacrum. On the Left SI joint also there was complete fusion of inner lip and ventral surface of dorsal segment of ilium with the corresponding articular surface of sacrum excluding both posterosuperior and posteroinferior iliac spine [Table/Fig-1]. Anteriorly, the articular margin of sacrum, ilium and articular surface of pubis were not fuse [Table/Fig-2]. Except for the fusion, other features of sacrum like sacral hiatus, cornu, sacral foramina etc showed no abnormal anatomy. To ascertain the gender of the bone (pelvis), pelvic anthropometric were considered. The sacral index was found to be 96.3, the Ischiopubic Index (IPI) was 87.4, the angle of the greater sciatic notch was 50°, and the subpubic angle of 80° was recorded. From the above findings it was concluded that the pelvis belonged to a male [1].



[Table/Fig-2]: Showing anterosuperior view of the pelvis, white arrows indicating unfused margins of sacrum, ilium and pubis.



[Table/Fig-1]: Posterior view of pelvis, white arrows showing fused sacroiliac joint in the posterior aspect.

DISCUSSION

Spondylarthropathy is a condition manifested with inflammation, fibrosis, calcification and reduced flexibility in the joints, it may even result in joint fusion. Biomineralisation involves the process of calcification; tissue mineralisation is a part of the physiological

process but can take a pathophysiological diversion in selective tissues (arteries, cartilages, muscles, joints etc.) in the human body [2]. In the human body, SI joint is a prone skeletal entity often may show the changes of AS. This joint is involved in uniform distribution and transmission of body weight through the pelvic girdle. Clinically, about 15-30% of cases with the chief complaints of low backache are due to SI joint inflammation [3,4] which is one of the important causes, often sidelined by the clinicians; it certainly requires a keen evaluation of structural and functional fitness of SI.

Bilateral fusion of SI is relatively a rare phenomenon, as reported in the present case. This malpresentation could be due to improper bone metabolism, inducing the undue formation of osteophytes, an additional growth of bone on its edge, which can lead to the bridging between the bones causing the symptoms of ankylosis. The chondrogenesis is a preliminary process of active bone formation associated with osteophyte bone formation, having a close resemblance with the healing process in the fractured bones [5].

The pelvis under discussion showed fusion of sacrum with the hip bone. Over a period of time there could be more and more bone deposition resulting in osteophyte formation further leading to fusion of articular parts between the ala of the sacrum with the ilium part of hipbone. Osteophyte formation could be due to the advanced ageing process, undue biochemical activity of cells, or because of mechanical stimuli, etc. It is seen commonly in the vertebral bones.

Such structural changes are noticed even in healthy individuals without obvious symptoms until it causes undue compression on neighboring structures. Such changes may lead to a variable degree of stiffness, movement restriction and pain in the joints [6,7]. There are number of biological growth factors which influence the osteophyte bone formation. A multifunctional cytokine, called transforming growth factor β is shown to be involved in influencing the induction of osteophytic changes in humans [8].

To understand the unresolved clinical complaints of low back pain, non invasive radiological investigations play as an important role in its early clinical diagnosis. The segmental analytical approach of SI through Positron Emission Tomography and Computed Tomography (PET-CT) scans is useful in the process of quantification of inflammation, along with the assessment of the state of reactive bone formation through F-fluorodeoxyglucose (FDG) (^{18}F -fluorodeoxyglucose) and NaF (Sodium Fluoride) assay, hence it is considered to be more sensitive when compared with Computed Tomography (CT) or Magnetic Resonance Imaging (MRI) [9]. Increase in Body Mass Index (BMI) causes constant stress on the locomotor activity which is associated with the inflammatory changes in the SI. Assessment of the metabolic activity by FDG and NaF PET/CT of either side of SI is correlated with the patient BMI. Since, there was difference in the extent of fusion of SI joint bilaterally, it may be inferred that there was a difference in the degree of inflammatory changes between the right and left SI joints. In a study, tracer uptake difference was found between the joint articular surfaces which may be attributed to the anatomical and physiological status with the advancing aging process. This could be attributed to the functional asymmetry of kinetic force transmitting from upper extremities during locomotor activities, may influence particular side of the body [10].

In some patients, with Ankylosing Spondylitis (AS), documented with positive clinical correlation with the Human Leukocyte Antigen (HLA)-B27, prevalence varies with the different ethnic groups [11,12]. The role of genetic component is strongly supported by higher concordance by showing the similarities in traits shared between a pair of twins [13]. AS involves diversified aetiological factors which will ultimately results in the explicit manifestation of clinical deformities. Chronic inflammatory changes in the vertebrae may further lead to joint ankylosis.

CONCLUSION(S)

Osteology is a basic prerequisite to pursue advanced learning in the musculoskeletal system. Among the set of AS disorders, the SI joint deformities poses great clinical challenges for its diagnosis and management of low back pain. The unbiased patient examination and selective radiological investigations are very much critical in early clinical diagnosis, without much time lapse. The knowledge of unusual variations like that in the present case is essentially important for Orthopaedicians, Neurosurgeons and Physiotherapists for treating the complaints of low back pain.

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