

KAUKO A. SOLONEN: The Sacroiliac Joint in the Light of Anatomical, Roentgenological and Clinical Studies.

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(Author's Abstract)

The first part of the investigation deals with the anatomy of the sacroiliac joint, specifically its osteology and innervation. The osteological study was carried out on pelvis skeletons and it demonstrated the existence of articular types that vary greatly in shape and are subjected to mechanical load in different ways. However, frontal section through the cranial part of the sacrum showed that in 88.5 per cent of the pelves the sacrum had the wedge-shaped form of a downward-tapering keystone.—Innervation of the sacroiliac joints was examined macroscopically in cadavers. The origin of the innervation on the ventral side was found to be variably L 3 – S 2 and on the dorsal side S 1 – S 2. Asymmetry was common in the innervation of the two sacroiliac joints. The obturator nerve did not participate in the innervation in any of the cases.

According to inferences on the statics and mechanics of the sacroiliac joint, one of the joints is in most cases considerably more exposed to strain and trauma than the other joint, due to the position and shape of the sacrum, or to the direction of the articular slit and position of the joint. A greater load is exerted upon the sacroiliac joint ligaments on the side with the narrower lateral mass of the sacrum, as well as on the sacroiliac joint whose lateral inclination in frontal section is smaller than that of the other joint. Furthermore a sacrum horizontale has the effect of increasing the load on the ligaments, and a joint with smooth and only slightly irregular articular surfaces tends to become dislocated more readily and lesion of the articular ligaments may here occur more easily.

Experimental roentgen examinations of anatomical specimens, using a lead strip to outline the articular slit and cast models of the articular slit for comparison, made it evident that roentgenograms of the sacroiliac joints made in the usual projections give but deficient and sometimes misleading information on the structure of the joint and the condition of its different parts. Frequently the Chamberlain method of

roentgenography may be of considerable assistance, especially in traumatic and other cases of instability.

Experiments to perform arthrography on anatomical preparations and clinical patients demonstrated that this method of examination usually is not feasible owing to the impossibility of performing the puncture of the sacroiliac joint. The practical value of arthrography would furthermore be reduced by the very small amount of contrast medium that could be accommodated by the articular slit.

Study of a series of patients with back pain examined at a surgical outpatient department during a period of $5\frac{1}{3}$ years showed that low back pain had been ascribed to the sacroiliac joint in 3.5 per cent of all patients with affections of the back, totalling 6,895 patients. On basis of the diagnoses the ratio of incidence of sacroiliac joint affections to the incidence of lesions of lumbar intervertebral discs was 1.0:10.4. In a clinical series this ratio was 1.0:20.0. Diagnoses which later were corrected seem to indicate that lesions of the sacroiliac joint are still more infrequent. Study of the case series and of the results of treatment appears to provide evidence that non-inflammatory lesions of the sacroiliac joints do occur also without severe traumas and that their surgical treatment, where indicated, is successful.

In differential diagnosis consideration should be given to rupture of an intervertebral disc. In the present series cases were found in which a ruptured disc had originally been treated as a sacroiliac joint lesion, but there were no cases in which the reverse would have been true. The so-called sacroiliac tests generally are non-specific and most of them usually give seemingly positive results also in severe cases of ruptured intervertebral disc.

In the examined cases of asymmetrical lesions or diseases of a lower extremity it was found that disturbed mechanism or statics of the lower extremities had in 75 per cent caused stress on the sacroiliac joint on the healthy or less affected side. This resulted in an increased density of the parasacroiliac bone, roentgenologically frequently simulating osteitis condensans ilei. The pathological condition of the lower extremities was not found to have produced a clinically demonstrable sacroiliac joint syndrome, and the roentgenographical finding probably is of interest chiefly from the point of differential diagnosis.

Observations made in the present investigation provide evidence in support of the opinion that underestimation during the past 20 years of the significance of lesions of the sacroiliac joint due to traumatic or structural causes has gone too far. This locus minoris resistentiae of

the pelvic girdle has a tendency to fatigue and traumas owing to certain characteristics and reactions observed also in this study, and since the sacroiliac joint embodies all the usual elements of an articulation it should also be held in mind as a source of subjective symptoms and objective signs.