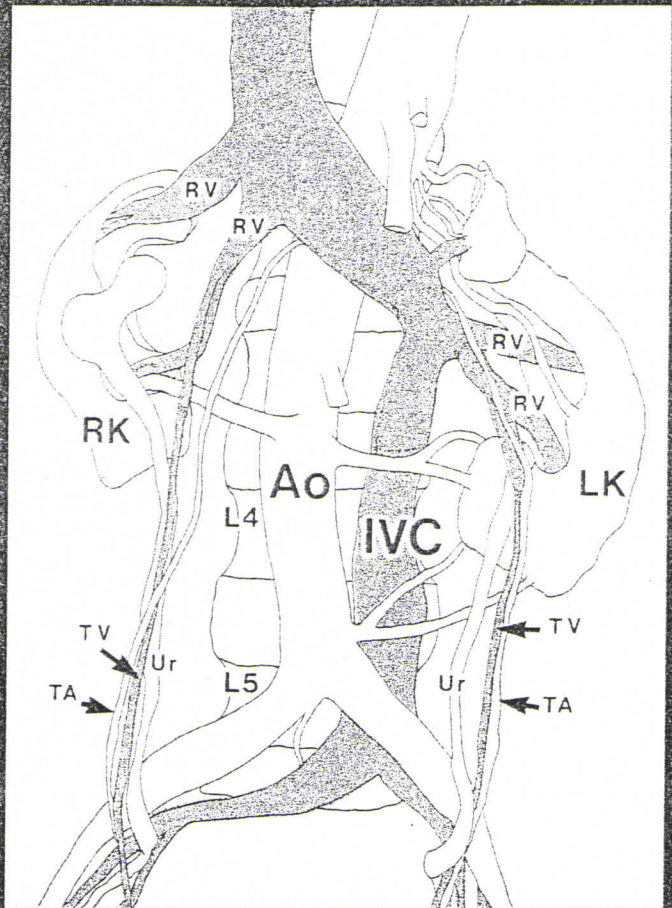
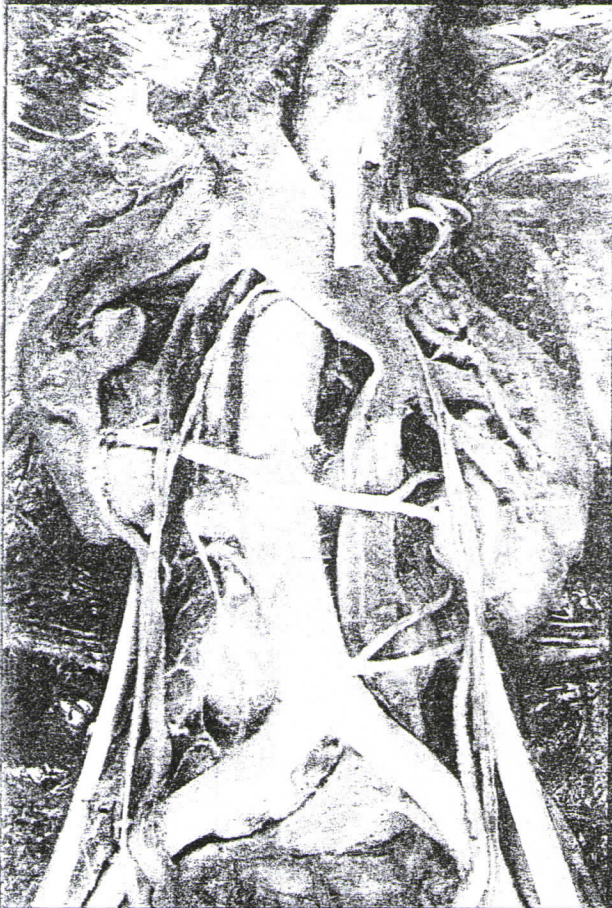


Acta Anatomica Nipponica

Volume 76, Number 6
December 2001



解剖学雑誌

Short Report

The Preauricular Sulcus: Its Radiologic Evidence and Prevalence

Ismail Nadir Gülekon^{1,2} and Hasan Basri Turgut¹

¹ Department of Anatomy, Faculty of Medicine, Gazi University

² Department of Radiology, Faculty of Medicine, Gazi University

(Received September 28, 2000; accepted February 23, 2001)

Abstract: The preauricular sulcus is a groove frequently seen on the iliac bone, adjacent and parallel to the inferior surface of the sacroiliac joint. It has been described as a characteristic of the female pelvis. A total of 3200 pelvic radiographs (1508 male and 1692 female) were examined and in 393 female (about 23%) the preauricular sulcus was encountered. None was seen in male radiographs.

Key words: preauricular sulcus, radiologic anatomy, prevalence

INTRODUCTION

The preauricular sulcus is a groove frequently seen on the iliac bone, adjacent and parallel to the inferior surface of the sacroiliac joint. It was first described and named in 1866 by Zaaier who found that the preauricular sulcus is occupied by fibers of the ventral sacroiliac ligaments. This has been confirmed by Loehr (1894) who also used the term "paraglenoid sulcus" and by Derry (1911). They stated that if the sacroiliac joint is dissected in a woman, the preauricular sulcus is seen to be entirely filled with ligamentous fibers.

Houghton (1975) and Kelley (1979) examined bony pelvis with pregnancy and parturition histories. They pointed out that the preauricular sulcus is the most reliable indicator of past pregnancy. Schemmer et al. (1995) investigated the hypothesis that the groove was due to resorption at the insertion of the anterior sacroiliac ligament in response to stress. They found a statistically significant relationship with deep grooves occurring only in parous women and an association with increased lumbar lordosis. On the other hand, Spring et al. (1989) found no statistically significant differences in frequency of deep, scooped-out grooves in women with no pregnancy history compared with those with past pregnancies.

Dee (1981) identified the preauricular sulcus on radiographs, and confirmed that a radiographic preauricular sulcus is uncommon in males and more common in females.

Because the preauricular sulcus can be frequently

seen on radiographs of the pelvis, our purpose was to examine the findings of Dee (1981) and to confirm this appearance as a finding of radiologic evidence of sex differences.

MATERIALS AND METHODS

We examined consecutive unselected pelvic radiographs of 1692 adult females and of 1508 adult males. The radiographs were obtained in supine position without tube angle. Patients with bony ankylosis or other severe arthropathies of the sacroiliac joints were excluded. Only adults older than 18 years of age were included in the study.

The preauricular sulci were graded 0-III (from no groove to a pronounced groove), based upon the appearance of the preauricular region using modified criteria as in the paper of Spring et al. (1989) (Fig. 1). All sulci were bilateral and most often quite symmetric in form and depth. In cases where the grooves were asymmetric, the right groove was used for classification. Slight differences were also resolved by classifying the grooves by their most predominant form.

RESULTS

The preauricular sulci were identified radiologically in 393 (23.2%) of 1692 females and in none of 1508 males. In all of the 393 female pelvis, the sulci were bilateral. 142 (36.1%) of the 393 female pelvis were grade I, 187 (47.6%) were grade II and 64 (16.3%) were grade III. The mean age of female subjects was 42.7 years and of male subjects 49.2 years. None of the female pelvis were triangular in contour. Summary data are given in Table 1.

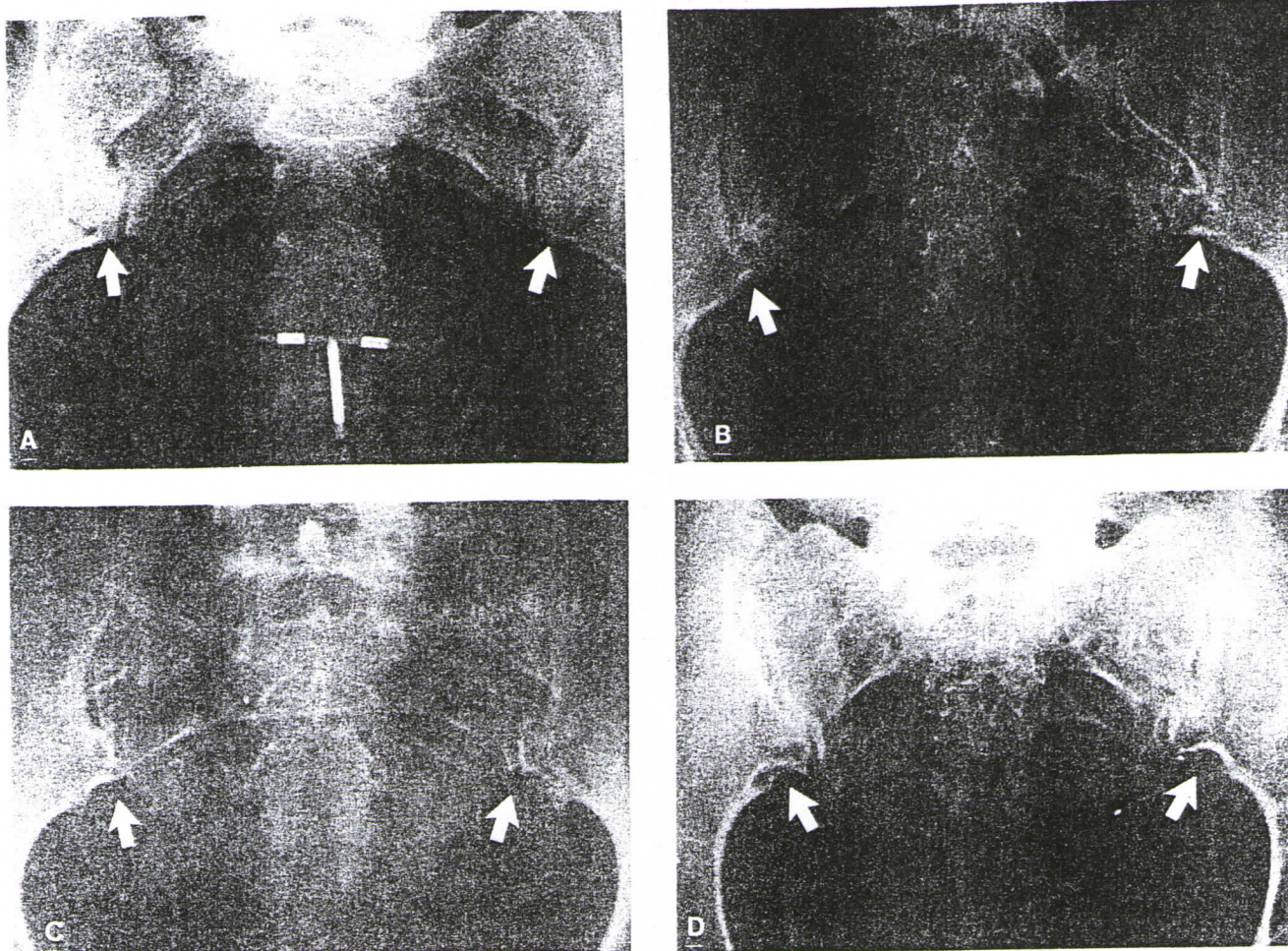


Fig. 1. Classification of the preauricular sulcus. A: Grade 0: No groove is visible (arrows). B: Grade I: A slight concave indentation on the preauricular region (arrows). C: Grade II: A definite, but smaller groove (arrows). D: Grade III: A wide (approximately 1 cm), deep (at least half the width) groove (arrows).

Table 1. Frequency of occurrence of groove classification.

Groove grade	Females		Males	
	n	%	n	%
0	1299	76.8	1508	100
I	142	8.4	0	0
II	187	11.1	0	0
III	64	3.8	0	0
Total	1692	100	1508	100

DISCUSSION

The preauricular sulcus is the site of insertion of the strong inferior portion of the ventral sacroiliac ligament. The groove entirely surrounds the sacroiliac joint and can be identified radiographically similarly as seen on dried bone specimens (Loehr 1894; Derry 1911).

In our study the overall prevalence of the preauricular sulcus was 23.2% in females. This ratio was reported as 25% by Dee (1981), 29% by Spring et al.

(1989) and 58% by Schemmer et al. (1995). Kelley (1979) found this ratio in 21% of nulliparous females and in 44% of women experiencing parturition. Finnegan (1978) made a detailed investigation of race, side and sex differences and age dependency in regard to the non-metric infracranial skeletal traits of 196 black and white individuals. He found significant differences between white and black male and female samples and also between white and black races.

In the present study, deep preauricular grooves were found in 3.8%, definite but smaller grooves in 11.1% and a slight concave indentation on the preauricular region in 8.4% of the female pelves. In their study, Spring et al. (1989) reported deep preauricular sulci in 15% and smaller grooves in 14%. Schemmer et al. (1995) reported this ratio as 14% and about 44%, respectively. Compared with these papers, a significant difference in deep grooves could be detected in both. In smaller grooves, no significant difference could be found between the study of Spring et al. (1989), but a sig-

nificant difference from Schemmer et al. (1995). Our sample population was younger than those of Spring et al. (1989) and Schemmer et al. (1995). We thought that this condition could be attributable to the existence of these differences. Though Dee (1981) used the same groove classification in his paper, no detailed result except the overall prevalence was reported.

Dee (1981) found the preauricular sulcus in 6% of male specimens and Spring et al. (1989) in about 3%. In our study, we could not detect any preauricular sulcus in males. Dee observed that when present in the male, the pelvis was triangular in contour and in none of the cases was the sulcus pronounced. On the contrary, none of the females who had an identifiable preauricular sulcus had a triangular pelvis. Houghton (1974) defined a shallow form of the sulcus to be present in males as

"GL" (groove for ligament) because of insertion of the strong inferior portion of the ventral sacroiliac ligament, and stated that such sulcus form would not help in gender identification. We agree with this observation of Houghton on that standpoint.

Radiologic examinations frequently provide information about the sex of the patient, although the evidence can be missed or ignored. It can be useful in making a differential diagnosis and preventing careless mistakes, especially when the sex of a patient is not clear from the person's name (Kurihara et al., 1996). We agree with the authors on that standpoint that the preauricular sulcus is a characteristic of female pelvis and is therefore particularly important in forensic medicine and anthropology.

REFERENCES

- 1) Dee PM (1981) The preauricular sulcus. *Radiology* 140: 354
- 2) Derry DE (1911) The significance of the sulcus preauricularis. *Anat Anz* 39: 13-20
- 3) Finnegan M (1978) Non-metric variation of the infracranial skeleton. *J Anat* 125: 23-37
- 4) Houghton P (1974) The relationship of the preauricular groove of the ilium to pregnancy. *Am J Phys Anthropol* 41: 381-389
- 5) Houghton P (1975) The bony imprint of pregnancy. *Bull NY Acad Med* 51: 655-661
- 6) Kelley MA (1979) Parturition and pelvic changes. *Am J Phys Anthropol* 51: 541-546
- 7) Kurihara Y, Kurihara Y, Ohashi K, Kitagawa A, Miyasaka M, Okamoto E, Ishikawa T (1996) Radiologic evidence of sex differences: Is the patient a woman or a man? *Am J Roentgenol* 167: 1037-1040
- 8) Loehr P (1894) Über den Sulcus praeauricularis des Darmbeins und ähnliche Furchen anderer Knochen. *Anat Anz* 9: 521-536
- 9) Schemmer D, White PG, Friedman L (1995) Radiology of the paraglenoid sulcus. *Skeletal Radiol* 24: 205-209
- 10) Spring DB, Lovejoy CO, Bender GN, and Duerr M (1989) The radiographic preauricular groove: Its non-relationship to past parity. *Am J Phys Anthropol* 79: 247-252