

## Clinical and radiographic features of spondylitic hip disease

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**SUMMARY** The clinical and radiographic features of hip disease in 76 patients with definite ankylosing spondylitis have been studied. Symptomatic hip involvement occurred late in the course of the disease, with a mean delay after the onset of 12 years in males and 7 years in females. Patients with disease onset before the age of 20 developed hip symptoms at an earlier stage. Associated diseases included uveitis (13%), colitis (4%), and psoriasis (4%). Bilateral concentric loss of hip joint space with a relatively undeformed femoral head was the commonest radiological change (61%). Localised loss of joint space at the upper pole (16%) was associated with femoral head destruction and a greater degree of osteophytosis, suggesting coincidental or secondary osteoarthritis. Bony ankylosis of the hips (10%) was present only in women, and the absence of osteophytes, cysts, and bone lesions of the iliac crests and ischial rami suggests that it is a distinct radiographic manifestation of female ankylosing spondylitis.

Ankylosing spondylitis characteristically affects the sacroiliac joints and the spine, but peripheral joint involvement occurs in at least 50% of patients during the course of their disease (Polley and Slocumb, 1947; Wilkinson and Bywaters, 1958; Resnick, 1974). Involvement of the hip is particularly common (Forestier *et al.*, 1956), with distinct radiographic appearances that may be used to distinguish spondylitic hip disease from that seen in rheumatoid arthritis or osteoarthritis (Glick, 1966; Dwosh, *et al.*, 1976). Hip disease in some patients may be more disabling than spinal rigidity and can be treated by total replacement arthroplasty (Welch and Charnley, 1970; Williams *et al.*, 1977). The purpose of this study was to define the clinical and radiographic features of a group of patients with spondylitic hip disease admitted for total hip joint replacement.

### Patients and methods

The medical records and pelvic radiographs of 76 patients with ankylosing spondylitis have been reviewed. The patients were consecutive admissions to Wrightington Hospital between January 1963 and December 1977 for total hip joint replacement. All the patients fulfilled the New York criteria for definite ankylosing spondylitis (Bennett and Wood, 1968).

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Clinical details obtained from the medical records included age at onset of disease, site(s) of initial symptoms, age at initial hip symptoms, associated diseases, previous medical and surgical treatment, and details of hip surgery during admission.

Preoperative pelvic radiographs were graded by the pattern of reduction of hip joint space, and 5 different patterns were recognised as shown (Figs. 1-5). In 5 patients preoperative radiographs were not available, so that their hips could not be classified. Protrusio acetabuli was recorded if the medial margin of the acetabulum crossed the ilioischial line (tear drop line of Köhler). The presence of osteophytes, subchondrial cysts, femoral head deformity, and bone lesions of the iliac crests, ischial rami, and symphysis pubis were recorded.

### Results

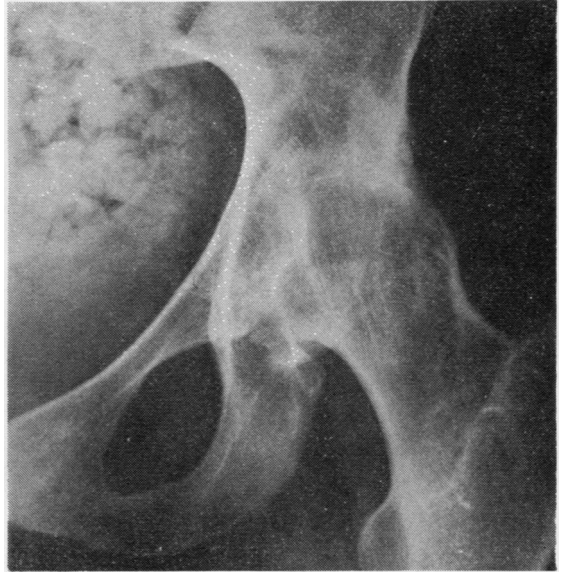
Seventy-six patients were included in the study (55 males and 21 females). The age and onset of spondylitic symptoms was similar in both sexes, with a mean age of 25 (range 9-56) in males and 22 (range 16-51) in females. Table 1 shows the site of onset of symptoms and indicates that, although most patients initially developed symptoms in the low back or buttocks and hips, in 8 men and 4 women hip involvement alone was the initial presenting feature. The age of onset of hip symptoms was similar in both sexes, with a mean age of 39 (range 9-72) in males and 35 (range 18-62) in females. The

interval between the onset of spondylitis and the development of hip symptoms was greater for men, with a mean interval of 12 years compared to 7 years for women, although in both groups the interval was

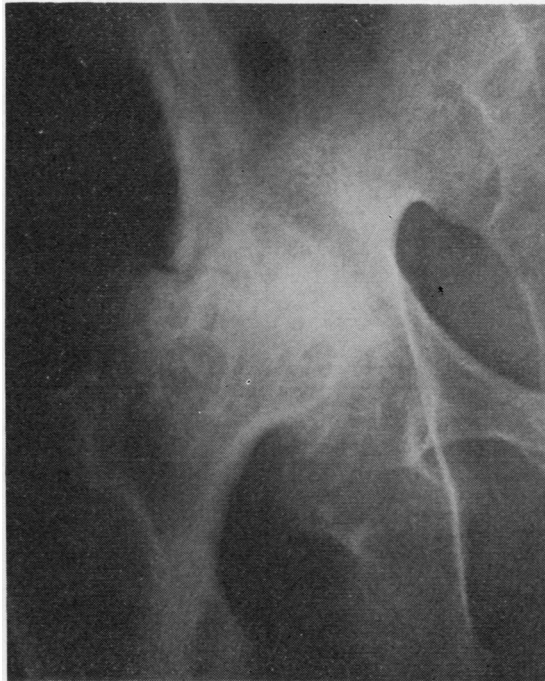
shorter in those where initial spondylitic symptoms were present before the age of 20 (Table 2). Hip symptoms were bilateral from the onset in 40% of cases and were eventually bilateral in almost all.



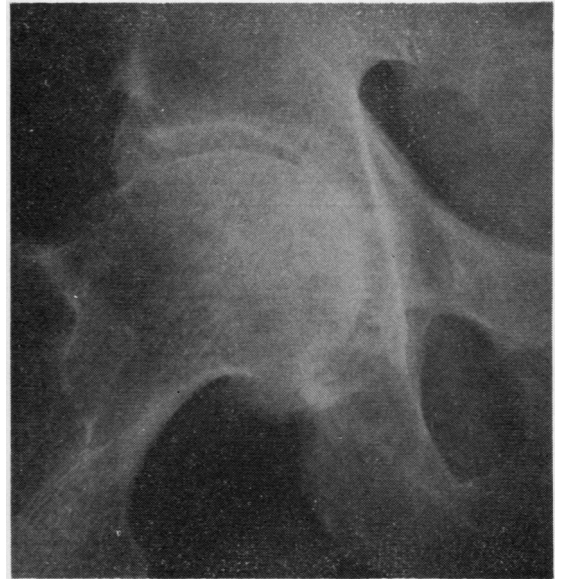
**Fig. 1** Concentric: *Concentric loss of joint space with moderate osteophytosis and undeformed femoral head*



**Fig. 3** Fused: *Bony ankylosis of hip joint with minimal osteophytosis.*



**Fig. 2** Upper pole: *Gross loss of head substance at upper pole and secondary subluxation*



**Fig. 4** Medial pole: *Joint space is narrowed medially but preservation of joint space at upper pole.*

Analysis for associated diseases indicated a past history of uveitis in 10 patients (13%, 9 males, 1 female) colitis in 3 (4%, 1 male, 2 females), and

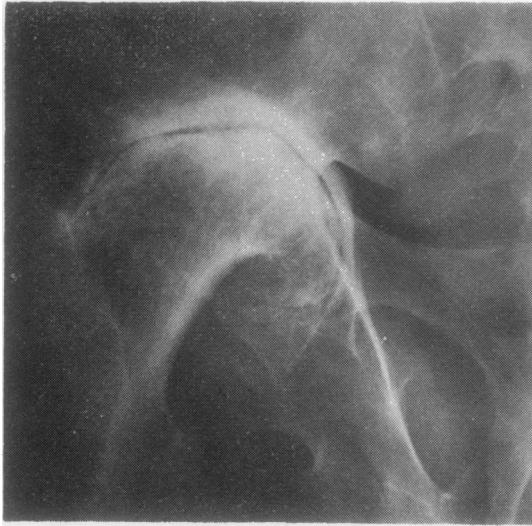


Fig. 5 Destructive: Generalised loss of head substance disproportionate to acetabular destruction. Sclerosis present, and joint space of sorts separating bones.

Table 1 Site of onset of symptoms

	Number of cases	
	Male	Female
Low backache	12	3
Buttocks and hips	7	2
Hips alone	8	4
Cervical spine	0	1
Knees	5	0
Shoulders	0	1
Feet	1	0
Polyarthrititis	3	0
Unspecified	21	10

Table 2 Interval between onset of spondylitis and hip symptoms

Sex	Age of onset of spondylitis (years)	Total no. of patients	Delay before onset of hip symptoms (yr)				
			0	1-5	6-10	11-20	>20
Male	0-10	1	1	0	0	0	0
	11-20	14	6	0	2	4	2
	21-30	17	2	2	2	5	6
	31-40	7	1	0	1	3	2
	41-50	4	0	2	0	1	1
	51-60	1	1	0	0	0	0
	No. with inadequate details		11				
Female	0-10	0	0	0	0	0	0
	11-20	5	2	0	3	0	0
	21-30	8	3	1	1	2	1
	31-40	1	1	0	0	0	0
	No. with inadequate details		7				

psoriasis in 3 (4%, 2 males, 1 female). Previous medical treatment had included x-ray therapy (25 cases, 19 males, 6 females), steroids (17 cases, 11 males, 6 females) immobilisation (10 cases, 8 males, 2 females), and traction (11 cases, 7 males, 4 females).

Hip surgery had previously been carried out in 10 patients and included osteotomy (1), excision arthroplasties (3), cup arthroplasties (3), Fluon arthroplasties (2), and an acrylic Judet arthroplasty (1). All patients were admitted for joint replacement, and 48 (63%) had bilateral replacements, including 5 cases that had previous hip surgery converted to low-friction arthroplasty. The mean age at the time of surgery was 44 (range 24-77) in males and 50 (range 31-67) in females, and the mean duration of hip symptoms prior to joint replacement was 8 years in both sexes.

Table 3 shows the different patterns of loss of joint space noted in the hip radiographs. If 5 patients whose preoperative radiographs were not available and the 10 patients who had previous surgery are excluded, there are 61 pelvic radiographs available for analysis. Concentric loss of joint space with minimal femoral head deformity was the commonest feature and was bilateral and symmetrical in 37 cases (61%). When the patterns of radiographic changes were related to sex it was found that bilateral fusion of hips occurred only in females. Table 4 shows the relative frequency in the different radiological groups of osteophytosis, cyst formation, femoral head deformity, and lesions of the iliac crests, ischial rami, and symphysis pubis. In the concentric group osteophytes were common, particularly on the acetabular margins (92%), but cystic lesions were less common and then usually femoral (40%). The group of patients with localised loss of joint space at the upper pole showed femoral head destruction (80%) and a greater tendency to osteophytosis and cystic lesions. Six patients with hip joint fusion

Table 3 Grading of hip radiographs

Pattern of x-ray change	Total no. of cases (61)	Males No. (44)	Females % No. (17)	%	
Bilateral concentric	37	29	66	8	47
15 with bilateral protrusio					
17 without protrusio					
5 with unilateral protrusio					
Bilateral fused	6	0	0	6	35
Bilateral upper pole	5	4	9	1	6
Mixed group	13	11	25	2	12
7 concentric upper pole					
1 concentric fused					
1 concentric destructive					
1 concentric medial					
1 bilateral destructive					
1 upper pole fused					

Table 4 Relation between pattern of loss of joint space and other radiographic features

Patterns of hip joint space loss	Total no.	Acetabular osteophytes	Femoral osteophytes	Acetabular cysts	Femoral cysts	Femoral head deformity	Iliac crest	Ischial rami	Symphysis sclerosis	Pubis Fusion
		No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
Bilateral concentric	37	34 (92)	28 (76)	6 (16)	15 (40)	3 (8)	11 (30)	23 (62)	14 (38)	6 (16)
Bilateral upper pole	5	5 (100)	5 (100)	3 (60)	5 (100)	4 (80)	3 (60)	3 (60)	3 (60)	1 (20)
Bilateral fused hips	6	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (17)	2 (33)

(bony ankylosis) had no evidence of osteophytosis or cystic changes. Bony changes in the iliac crests and ischial rami were common features present equally in the bilateral concentric and bilateral upper pole groups but were absent in the group with fused hips. Lesions of the symphysis pubis were noted in all groups, but there was a greater tendency to fusion in those patients with fused hips.

## Discussion

The age and site of onset of symptoms were similar to those noted in other series. The mean interval between symptomatic hip involvement and disease onset was more than 10 years in men and 5 years in women, and only 38% of the whole group developed hip symptoms within 5 years. This late onset of symptomatic hip disease contrasts sharply with the early onset noted in other spondylitic series (Forestier *et al.*, 1956; Wilkinson and Bywaters, 1958) and in particular with the 75% involvement within 5 years noted by Dwosh *et al.* (1977). There was, however, a tendency for patients whose spondylitis started at any earlier age to develop their hip symptoms sooner, and 45% of those with disease onset below 20 as opposed to 34% with onset above 20 developed hip symptoms within 5 years. The occurrence of hip symptoms as a late feature of spondylitis in this series may have been biased by selection of patients with advanced hip disease requiring surgery.

Uveitis was present in 10 patients (13%). This is a lower incidence than the 20% noted in other series (Blumberg and Rogan, 1956) and may be explained by the retrospective nature of the present study. The frequency of colitis (4%) and psoriasis (4%) is comparable to that in other series (Fletcher and Rose, 1955; Meuwissen *et al.*, 1978). Previous treatment with immobilisation (13%) and traction (14%) was noted particularly in patients with a long duration of symptoms before surgery.

The radiographic features of the abnormal hips in this study have been compared with those noted in two other studies of spondylitic hip disease (Table 5). The reduction of joint space was considered an essential criterion for the diagnosis of hip disease

Table 5 Comparison of hip radiographs with previous series

	This study	Glick (1966)	Dwosh <i>et al.</i> (1976)
	121 abnormal hips (%)	150 abnormal hips (%)	81 abnormal hips (%)
Loss of joint space	100	20	55
Concentric loss	70	Not specified	50
Superior (upper pole) loss	16	Not specified	6
Protrusio acetabuli	28	4	30
Hip ankylosis	10	12	2.5

and may explain its greater frequency in this study, though this might have been expected because of the selection of cases with advanced disease requiring surgery.

A distinction between 2 types of hip involvement in ankylosing spondylitis was first suggested by Forestier *et al.* (1956). It has been confirmed that the commonest radiographic appearance is concentric loss of joint space, which is usually bilateral and symmetrical and is associated with a relatively undeformed femoral head. The smaller group of patients with upper pole loss of joint space and femoral head irregularity may represent patients who have coincidental osteoarthritis or who have developed secondary osteoarthritis as a consequence of earlier spondylitic hip disease.

Bony ankylosis has traditionally been regarded as the end result of spondylitis affecting the hip, and its low frequency in this study was a surprise in view of the end stage nature of the cases. Six patients, all women, had bilateral hip ankylosis (fusion) without femoral head deformity. Osteophytic and cystic changes were strikingly absent from this group, which appears to be a distinct radiographic entity not previously described as a feature of female spondylitis (Tyson *et al.* 1953; Hart and Robinson, 1959; Hill *et al.*, 1976; Resnick *et al.*, 1976). These 6 patients were indistinguishable from the other female patients in the series as regards the onset of spondylitis and hip symptoms, the involvement of other peripheral joints, and previous treatment. One of the 6 patients had necropsy evidence of ulcerative colitis, but there were no other associated diseases in the remaining 5 cases.

Irregular periosteal new bone formation around the iliac crests and ischial rami was equally common in the groups with concentric and upper pole loss of joint space as was noted in the series of Dwosh *et al.* (1976), but this frequency was twice that reported in another large series in which pelvic radiographs were specifically examined for its presence (Wilkinson and Bywaters, 1958). This finding contrasts with the absence of 'periostitis' in the small group with fused hips and supports the view that this group is a distinct entity. Erosion and sclerosis of the symphysis pubis was another common finding in all groups, but bony ankylosis of the symphysis pubis was particularly common in the group with fused hips.

Hip disease is a common feature of ankylosing spondylitis and may occur at any time during its course. Treatment of spondylitic hip disease by low friction arthroplasty is now possible, and it is important to recognise that different radiographic patterns of hip involvement occur and could influence surgical results.

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