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A CLINICAL AND RADIOLOGICAL FOLLOW-UP STUDY OF TRANSIENT SYNOVITIS OF THE HIP

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Transient synovitis of the hip (coxitis simplex, irritable hip, observation hip) is well known in the literature and many papers have been published concerning the diagnosis and clinical features of the disease (among others by Rauch 1940, Colonna 1941, Lucas 1948). There have been discussions about its conceivable importance for later occurrence of osteoarthritis in the affected hip (Harrison, Schajowicz & Trueta 1953, Murray 1965).

Few long-term follow-up studies have been published. In 1963 Valderrama reported from a material of 189 children, 23 cases followed for at least 15 years with clinical and radiological examinations. Holenstein (1966) followed 12 out of 37 cases for periods between 5 and 27 years, and Spock (1959) and Adams (1963) have reported series of about 50 cases, each followed for an average of 5 years.

Valderrama (1963) regarded the disease as rather serious since about 50 per cent of 23 cases followed by him showed radiological and clinical symptoms of hip-disease probably related to the previous transient synovitis. He also mentioned that there were more radiological signs than clinical and that adequate investigations into "normal" hip radiograms in patients 20–30 years old are lacking in the literature. Holenstein (1966) questioned the benignity of the disease on the basis of 12 cases, out of whom 2 had subjective complaints, 7

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slight limitions of hip mobility, and 5 some radiological changes like broadening of the femoral head and neck and calcifications.

It is known that a few patients with transient synovitis of the hip after some time will develop Perthe's disease (coxa plana). According to Spock (1959) this will occur in 6 per cent of the cases.

In this study based on a material of 73 cases of transient synovitis of the hip followed for 20–22 years, the clinical and radiological development of the disease has been investigated. A separate roentgenographic study of 36 subjects of comparable ages without any previously known hip disease has been included, first, to study normal standards in this age group and second, to serve as a basis for comparison.

MATERIAL AND METHODS

Clinical Evaluation

The material consisted of 102 patients treated at the Hospital for Sick Children in Göteborg during the years 1945, 1946, and 1947. All the children fulfilled the criteria mentioned, among others, by Spock (1959) for the diagnosis of transient synovitis, e.g. subacutely occurring pain in one hip with painful limitation of motion, slightly elevated temperature, moderate increase of sedimentation rate, negative radiogram of the hip, and a relatively quick and uncomplicated recovery.

Out of the total 102 patients 6 later developed Perthe's disease in the affected hip and were excluded (Table 1).

Table 1. Material.

Diseased in year	Prelim. diagnosis trans. synov.	Defin. diagnosis trans. synov.	Defin. diagnosis coxa plana	Follow-up (20–22 years)	
				Clinical and radiol. exam.	Contacted by questionnaire
1945	27	24	3	20	0
1946	38	36	2	23	5
1947	37	36	1	24	1
	102	96	6	67 (76%)	6

It was possible to trace 73 of the remaining 96 patients. Of these 67 were personally evaluated at a follow-up which was performed at the end of 1967 and in the beginning of 1968. Six additional patients responded to a questionnaire. Thus 76 per cent of the original material was followed for 20–22 years. A summary is given in Table 2 of pertinent data at the time of onset of the disease for these 73 patients.

The remaining 23 patients were lost for follow-up. A statistical analysis of the preliminary findings in the 73 patients followed compared with those of the 23 that could not be traced demonstrated no difference with regard to sex, age, sedimentation rate, temperature rise on admission, or treatment. From a statistical point of view it is thus likely that the results obtained in the followed group are representative. The clinical examination included an interview in which the subjects were specifically asked for recurrences and previous or present allergic, tuberculous, or rheumatic diseases. Any subjective complaints from the hip joints were noted. The orthopaedic evaluation included control of gait, measuring of joint motion and leg length. The different motions recorded were: extension (lying on one side, with the lower hip maximally flexed), flexion (supine, the other leg extended), adduction (supine), abduction (supine), rotation (supine, with hip in 90° of flexion as well as in extension).

The leg length was measured by recording, with measuring tape, the distance from the anterior superior iliac spine to the tip of the medial malleolus.

At the examination great care was taken to compare the two hips. In all except three cases, neither the examiner nor the patient knew until after the examination which of the two hips had been previously diseased.

Radiographic Evaluation

Of the 73 patients followed, radiograms were obtained from 67. Of these 58 had also been roentgenographically examined within one week after the initial admission to the hospital.

The control group contained 36 persons, e.g. 72 hip joints, who gave no history whatsoever of hip joint disease. In this group there were 19 males and 17 females with the medium age of 25 years (20–34 years).

The roentgenographic examination, which was performed in the same manner at the time of hospitalization and at follow-up included an antero-posterior view of the pelvis and separate films of each hip joint in both the frontal and the Lauenstein projections. The roentgenographic examination aimed only at obtaining an appraisement of the skeleton and not of the soft tissues.

At follow-up the films from the two hip joints in each patient were compared, especially with regard to the width of the joint space and the form and magnitude of the femoral head. The presence was registered of osteophytes or other irregularities on the edge of the joint surface of the femoral head as well as irregularities of the spongiosa in the form of cysts or islands of compact bone. Such findings were also noted in the femoral neck and in the acetabulum. Around the acetabulum, calcifications as well as ossifications like os acetabuli near the joint space were registered. The examiner did not know which of the patient's two hips had previously been diseased.

RESULTS OF THE CLINICAL FOLLOW-UP

History

Of the 73 interviewed patients 12 gave a history of some type of pain or discomfort from one of the hip joints (Table 3). In none of these

Table 2. Summary of initial clinical findings in 73 patients

Sex		Age (yrs)			Sediment. rate (mm)	
Males	Females	mean	range		mean	range
48	25	7.1	1–13		11.6	2–35

were the symptoms of such magnitude that the patients had sought medical advice, except in one case. This patient was a woman of 35 years who had been hospitalized for 105 days 22 years previously because of persisting symptoms of hip synovitis. The radiograms had been negative on admission as well as dimissal from the hospital in 1945. Two years later she was re-admitted under the same diagnosis for 10 days. At that time a coxa magna was seen. There had been no signs of other diseases on these two occasions, nor was there any evidence of such at the follow-up. Of the 12 patients with subjective complaints 9 had had their transient synovitis on the same side, whereas 3 complained of slight troubles from the previously unaffected side (Tables 3 and 9).

Table 3. Subjective complaints, 12/73 patients (16.4%).

	Originally diseased hip	"Positive" radiogram (only 67 pat. examined)	Lim. of motion (>10°)	Originally unaffected hip	"Positive" radiogram (only 67 pat. examined)	Lim. of motion (>10°)
Some-starting stiffness or discomfort	4	3	1	0		
Occasional pain walking long distances	4	4	3	3	3	2
Pain when walking, sometimes at rest	1	1	1	0		
	9 (12.3%)			3 (4.1%)		

Altogether 12 of the 73 patients (16.4 per cent) gave some history of an allergic disposition. Three had had asthmatic troubles in childhood and the remaining 9 had reacted to flowers or food severely enough to be medically treated.

with transient synovitis of the hip, followed 20–22 years.

Temp. on admission (°C)		Hospitalization (days)		Treatment		Radiograms obtained
mean	range	mean	range	Bedrest	Traction	(all neg.)
37.5	37.0–40.2	13.2	1–105	11	62	62

Clinical Examination

Altogether 18 of the personally evaluated 67 patients had some limitation of motion of either hip joint. (Differences less than 10° have been excluded). These limitations never exceeded 20°. The motion qualities most often restricted were inward rotation (10 patients), flexion (6 patients), and extension (5 patients).

15 patients exhibited some limitation on the affected side, 3 on the other side. Reduced motion in more than one of the tested directions occurred in 6 cases only, all of whom had had their transient synovitis on the same side. Statistically there is a definite correlation between previous transient synovitis and limitation of motion.

Of those 12 patients with subjective symptoms from one hip, 7 also had limitation of motion on the same side (Table 3), and one was limited in extension on the other side. The correlation between discomfort or pain from the hip and limitation of motion in the present material is not significant.

29 had leg length differences of 1 or 2 cm; 17 were shorter on the originally affected side and 12 were longer.

Two patients had recurrence of their transient synovitis 2 and 3 years, respectively, after original onset. One was the female patient with more pronounced complaints mentioned above, the other one, also a female, at follow-up had no subjective complaints and showed a limitation of extension of 10° but had no radiographic changes.

RESULTS OF THE RADIOLOGICAL FOLLOW-UP

As previously mentioned the original radiograms revealed no pathologic changes in the hip joints of the 62 patients examined on admission to the hospital 20–22 years earlier. These radiograms have been re-considered for the present study, without any change of the initial appraisal. At follow-up negative radiograms were found from both hip joints in 21 of the 67 patients. A positive radiogram of some

kind was seen in 46 patients of which 23 had changes in one hip joint and 23 had bilateral changes. Thus a positive radiogram was found in 69 and a negative in 65 hip joints. From Table 4 the presence of a positive or negative radiogram in the two hip joints can be seen. In the previously diseased hip a positive radiogram was found in 40 and a negative in 27 cases. In the previously non-affected hip 29 exhibited positive findings and 38 were normal.

Table 4. The incidence of roentgenographically positive and negative joints in the previously diseased and unaffected sides of 67 patients at follow-up.

	Roentgenographic findings		Total
	+	—	
Previously diseased hip	40	27	67
Previously unaffected hip	29	38	67
Total	69	65	134

As mentioned above the positive findings at radiography were located in (1) *the joint space,* (2) *the head of the femur,* (3) *the neck of the femur,* and (4) *the acetabulum.*

1. *Joint Space* (Table 5)

A decreased height of the joint space was seen in one of the hips in 4 patients. In 2 of these the whole joint space was 1–2 mm lower than in the other hip and in another 2 patients this reduced height was seen only in the medial part of the joint.

Table 5. Incidence of radiographic changes in the femoral

	Joint space				*Femoral*
	Narrow	subj. compl.	lim. of motion	*Caput magnum*	subj. compl.
Previously diseased hip	3	2	1	7	1
Previously unaffected hip	1	0	0	3	1
No. of joints	4			10	
Bilateral	0			–	

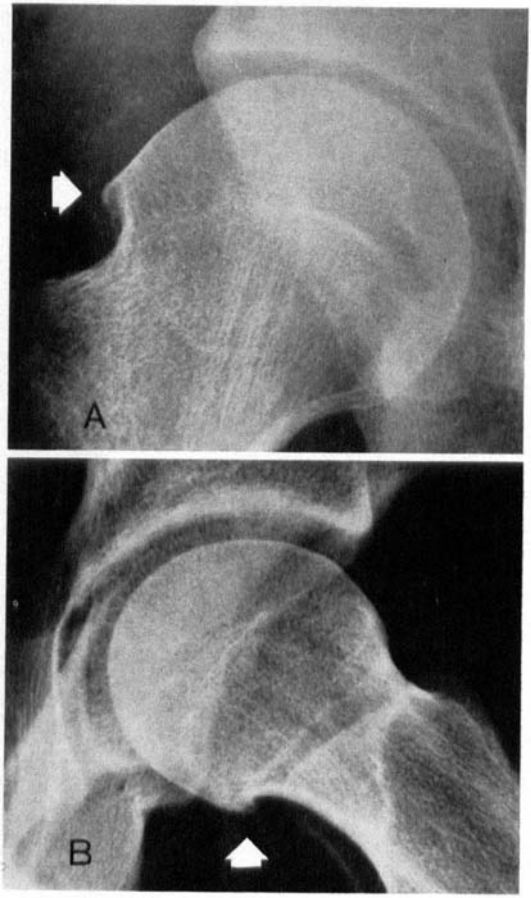

Figure 1. Osteophytes on the edge of the femoral head.
A: Laterally situated in the previously diseased hip of a 27-year-old male.
B: Posteriorly situated in the previously unaffected hip of a 26-year-old female.

head and joint space narrowing in 67 patients at follow-up.

head						
lim. of motion	*Osteo-phytes*	subj. compl.	lim. of motion	*Dense spots*	subj. compl.	lim. of motion
1	9	1	2	3	1	1
1	9	3	2	2	0	0
	18			5		
	5			0		

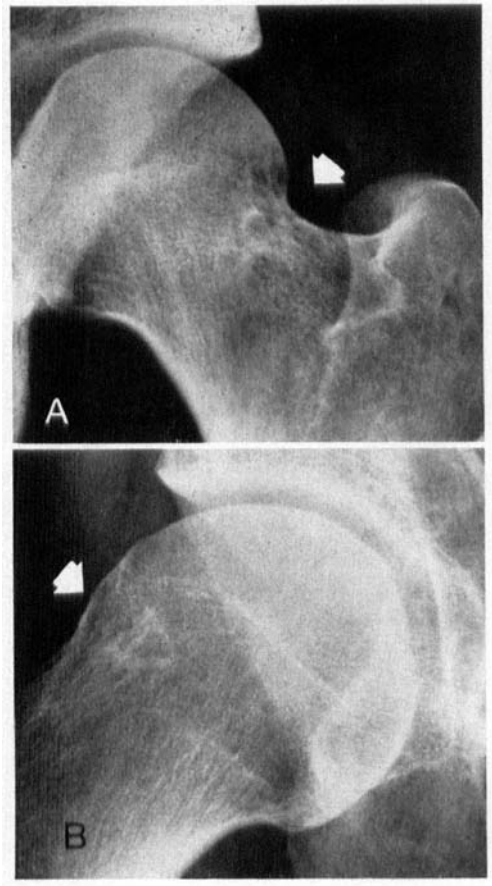

Figure 2. Cysts in the femoral neck A: Multiple rounded cyst laterally in the previously diseased hip of a 29-year-old male. B: Solitary, triangular-shaped cyst laterally in the previously diseased hip of a 28-year-old male.

Three of these 4 hip joints had previously been affected by transient synovitis, whereas the fourth was previously unaffected. In this patient the whole joint space was narrower than in the other, previously diseased hip.

2. *Head of the Femur* (Table 5)

(a) *Caput magnum.* In 10 patients the femoral head on one side was bigger than on the other side. The comparison was made by measuring the transverse diameters in the A-P view. A difference was only recorded if it exceeded 1 mm. In none of the cases was the difference more than 3 mm.

Seven of these 10 hip joints with a larger head had previously been diseased whereas the other 3 were on the unaffected side.

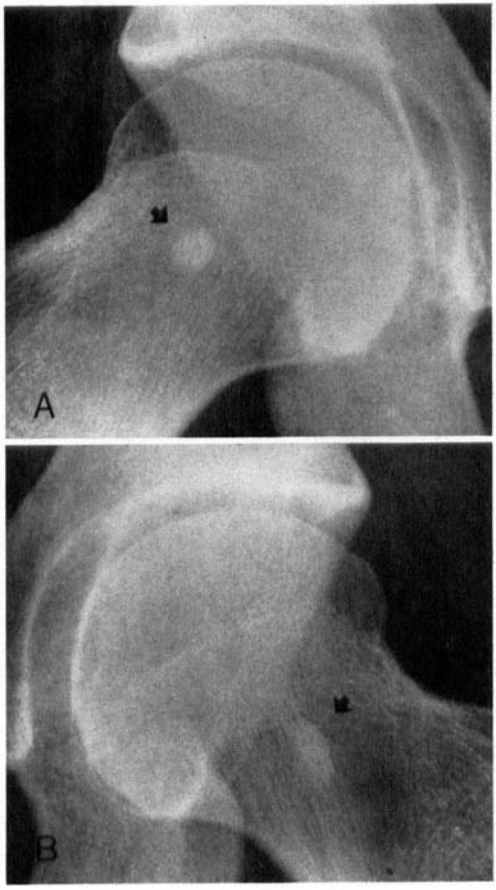

Figure 3. Dense spots in the right hip (A) and the left (B) previously diseased hip of a 25-year-old male.

(b) *Osteophytes* (Figure 1). Osteophytes or similar deformities were seen on the edge on the femoral head in 13 patients. Five of these had changes of this type symmetrically located in both the hip joints. Of the 8 remaining cases the osteophytes were located in the previously diseased side in 4 instances.

Altogether 18 hip joints showed osteophytes of which 9 had previously been diseased. The osteophytic changes were in 13 joints localized on the posterior and in 2 joints on the medial part of the edge of the femoral head.

The shape and magnitude of the osteophytes were the same in both the previously diseased and unaffected hip joints. In most of the cases rounded projections or protrusions were seen at the edge of the joint surface of the femoral head. The height varied between 1 and 3 mm

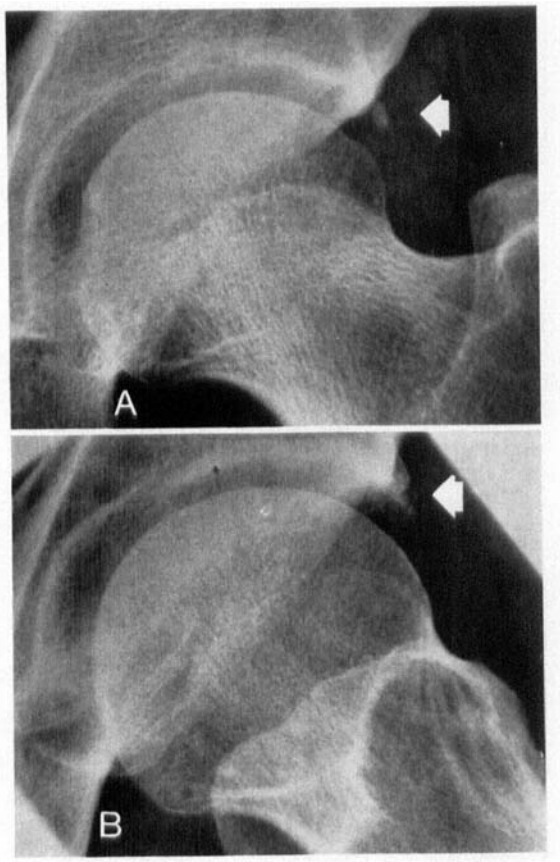

Figure 4. Calcifications at the edge of the acetabulum. A: Solitary, in the previously diseased hip of a 25-year-old male. B: Multiple, in the previously diseased hip of a 31-year-old male.

and the basal width between 2 and 8 mm. In a few cases a triangular shape was noted.

(c) *Cysts.* No cystical changes were seen in the spongiosa of the femoral head in any patients.

(d) *Dense spots.* Dense spots in the spongiosa of the femoral head were seen in 5 patients and only on one side; 3 of these had previously been diseased.

The shape of the dense spots was rounded, with sizes varying between 3 and 7 mm. They were localized in the medial part of the head in 2 cases and lateral part in 3 cases.

3. *Femoral Neck* (Table 6)

(a) *Cysts* (Figure 2). Rounded cystical areas of less dense bone in the spongiosa of the neck, often surrounded by a thin sclerotic zone, were

Table 6. Incidence of radiographic changes in the femoral neck in 67 patients at follow-up.

	Cysts	subj. compl.	lim. of motion	*Dense spots*	subj. compl.	lim. of motion
Previously diseased hip	16	2	1	8	0	0
Previously unaffected hip	6	0	0	5	0	0
No. of joints	22			13		
Bilateral	4			3		

seen in 18 patients. In 14 they were unilateral, in 4 bilateral. Of the 22 hips with this type of cystical changes, 16 had previously been diseased. The diameter of the cyst varied between 2 and 10 mm, mostly 4–5 mm. They were solitary in 9 hips, two or more in the remaining 13. The localization was medial in 8 instances and lateral in 14.

(b) *Dense spots* (Figure 3). In 10 patients such could be seen in the spongiosa of the femoral neck. In 3 they were bilateral. Of the 13 hip joints with this type of change, 8 had previously been diseased.

The size and shape of the dense spots were the same as in the femoral head and in all cases, except two, they were solitary. The localization was in 7 instances medial and in 6 lateral.

4. *The Acetabulum* (Table 7)

(a) *Cysts.* No such changes could be detected in the spongiosa of the acetabulum.

(b) *Dense spots.* Such changes were seen in one of the joints of two patients. In both they were situated in the previously unaffected joint. The shape was oval with diameters of about 5 × 10 mm, with the main orientation in the direction of the spongiosa.

Table 7. Incidence of radiographic changes in the acetabulum in 67 patients at follow-up.

	Dense spots	subj. compl.	lim. of motion	*Calcific.*	subj. compl.	lim. of motion	*Os acetabuli*	subj. compl.	lim. of motion
Previously diseased hip	0	0	0	15	4	4	1	0	0
Previously unaffected hip	2	1	1	6	0	0	1	0	0
No. of joints	2			21			2		
Bilateral	0			4			0		

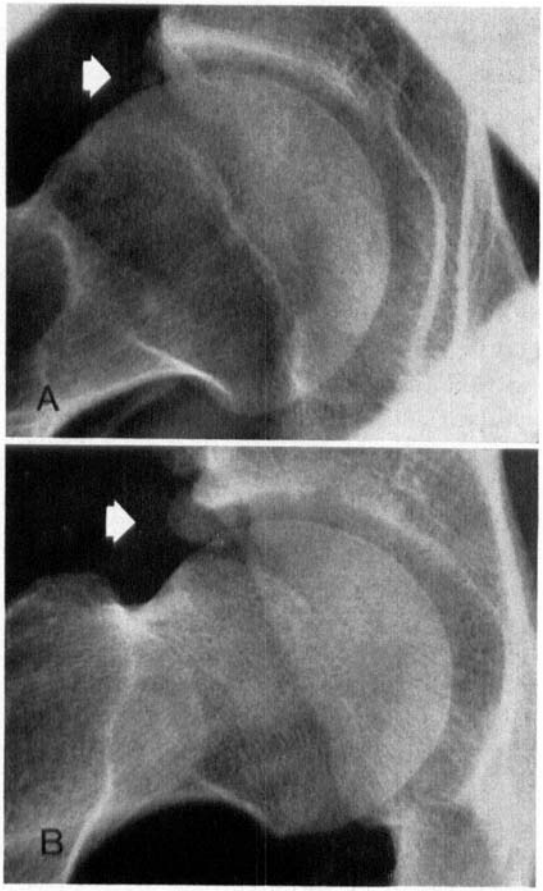

Figure 5. Os acetabuli. A: In the previously unaffected hip of a 27-year-old male. B: In the previously diseased hip of a 22-year-old male.

Table 8. Radiographic changes recorded at follow-up in the diseased and unaffected hip history of hip

	No. hips X-rayed	No. negative radiograms	*Joint space* Narrowing	*Femoral head* Caput magnum	Osteo-phytes	Cysts	Dens spots
Previously diseased hip	67	27	3	7	9	0	3
Previously unaffected hip	67	38	1	3	9	0	2
Controls	72	45	1	0	11	1	1

(c) *Calcifications* (Figure 4). These could be seen at the proximal part of the edge of the acetabulum in 17 patients. In 4 they were bilateral, in 13 unilateral.

Altogether 21 hip joints, of which 15 previously had been diseased, exhibited calcification.

They were in all instances located 1–3 mm lateral to the proximal part of the posterior acetabular joint edge. They were all round or oval, sizes varying from 1 × 1 mm to 3 × 5 mm. More than half of them had a diameter exceeding 2 mm. In 11 of the 21 joints with this change they were solitary, in 8 there were two or three. In one patient there were bilateral multiple calcifications.

(d) *Os acetabuli* (Figure 5). A true accessory bone with cortical as well as spongious parts, located in a small excavation in the proximal part of the posterior acetabular joint edge, was seen in two patients, one of which had this bone in the previously diseased hip. One was oval, with diameters 10 × 20 mm, the other round, 4 × 4 mm.

Controls (Table 8)

With the exception of caput magnum all the radiographical changes described in the patients could also be seen in the control subjects. One of these also exhibited cysts in the spongiosa of the femoral head, a change that was not seen among the patients.

Table 8 shows the type and occurrence of the different positive radiographic findings in both the controls and the material of followed patients.

of 67 patients with previous transient synovitis of one hip, and in 36 controls with no joint ailment.

Femoral neck		*Acetabulum*				Total no. radiolog. changes
Cysts	Dense spots	Cysts	Dense spots	Calcific.	Os acetabuli	
16	8	0	0	15	1	62 in 40 hips
6	5	0	2	6	1	35 in 29 hips
5	1	0	2	12	2	36 in 27 hips

1. *Joint Space*

A narrow joint space was seen in one of the hips in this group.

2. *Femoral Head*

(a) *Caput magnum.* In this group the size of the two femoral heads equalled each other in all subjects.

(b) *Osteophytes.* This change was seen in 8 subjects, 3 of which had bilateral osteophytes and 5 unilateral, totalling 11 hips with this type of change.

(c) *Cysts.* This change was seen in the femoral head of one hip in this group, where there were 2 rounded areas of less dense bone each 4×5 mm.

(d) *Dense spots.* One such spot, of the size 3×5 mm, was seen in one femoral head.

3. *Femoral Neck*

(a) *Cysts.* This change was noticed in one of the hips in five subjects. The sizes were the same as seen in the followed material. Three located lateral and two medial in the femoral neck.

(b) *Dense spots.* This change, of the size 4×4 mm, was seen in the lateral part of one femoral neck.

4. *The Acetabulum*

(a) *Cysts.* As among the patients no cyst localized in the spongiosa of the acetabulum was seen in the controls.

(b) *Dense spots.* Bilaterally this was seen in one of the subjects in the control group. They were rounded, 3–5 mm in size, and were double in one of the hips, single in the other.

(c) *Calcifications.* With the same localization as among the followed subjects these were seen in 12 hips of the controls. In 4 subjects they were bilateral, in 4 unilateral. In 9 of the hips there was only one calcification, in 3 there were two.

(d) *Os acetabuli.* One of the hips in two subjects exhibited this accessory bone. The sizes were 4×6 mm and 10×14 mm, respectively.

DISCUSSION

As mentioned in the introduction, previously published long-term follow-up studies on transient synovitis of the hip (Valderrama 1963, Holenstein 1966) have questioned the benignity of the disease. These conclusions have been based, however, on limited series of patients, representing only a fraction of the original number of patients.

The present study of 73 patients of which 67 were personally examined and radiographed represents 76 per cent of the original material treated at the Hospital for Sick Children in Göteborg during the years 1945–1947. Statistically there was no difference in age, sex, or the initial stages of the disease between those 23 that could not be traced and the followed 73 patients. Thus, the conclusion drawn from the present material should be representative.

It is well known that some of the patients with coxa plana, at the onset of their disease, show a similar clinical picture as those with a transient synovitis. The development of the condition will disclose the true diagnosis. In the present material 6 patients who originally were diagnosed as transient synovitis later (1 month–14 months) developed a coxa plana. The incidence is exactly the same, 6 per cent, as reported by Spock (1959). The aetiology of transient synovitis is not known. There have been discussions in the literature about trauma, infection, rheumatic disease, and allergic origin (Spock 1959, Hermel & Albert 1962, Emr 1966). In two different materials (Spock 1959, Hermel & Albert 1962) the incidence of children showing allergic reaction has been 15 per cent and 25 per cent, respectively.

Spock concluded this to be about the same as in the average general population, a view which is supported by the present study, where 16.4 per cent gave some history of an allergic disposition.

The incidence of allergic manifestations in the adult Swedish population is 13 per cent according to Colldahl (1959, 1968), and Kraepelin (1954) reported a 1.4 per cent incidence of asthma in Swedish school-children. Compared to these figures no statistical evidence of a special allergic disposition in children with transient synovitis can be demonstrated. None of the followed cases gave any history of rheumatic or tuberculous disease.

In the present material the clinical sequelae of a previous transient synovitis of the hip are relatively mild and far from common. In only one patient can it be said that the residual symptoms were of such magnitude that they could be regarded as important. This then 13-

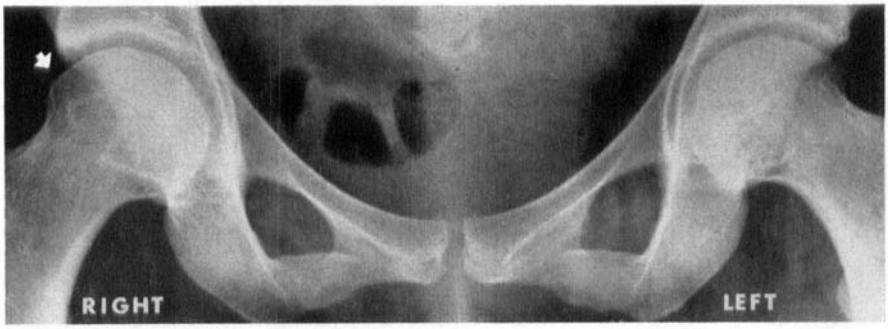

Figure 6. Antero-posterior pelvic view of a 35-year-old female who at follow-up reported pain at rest from the previously diseased right hip. She also exhibited restricted motion in most directions as well as a noticeable limp. The radiogram showed a caput magnum on the right side as well as a cyst in the femoral neck and an osteophyte on the edge of the femoral head (seen in the lateral projections).

year-old girl had persisting symptoms for such a long time that bed-rest and traction were maintained for 105 days. This prolonged course of the disease might raise the question whether she really had had transient synovitis, since one of the criteria mentioned by Spock (1959) was the relatively fast self-limiting course. On the other hand, it was impossible at the time of original treatment, at recurrence two years later, or at follow-up to obtain any other diagnosis (sedimentation rate 7 mm, temperature 37.8 on admission and then normal, laboratory tests normal, cerebrospinal fluid normal). It is also of interest to note that this girl was the oldest in this material. Valderrama (1963) mentioned that the older the patients the less benign the disease and the more frequent the development of coxa magna. At follow-up this patient reported pain when walking, exhibited a slight limp, was limited in motion in 5 directions, and on the radiograms her previously diseased hip showed a caput magnum, osteophytes, and a cyst in the femoral neck (Figure 6).

With the exception of this case no correlation was found in the present material between, on the one hand, age or sex of the patient and the preliminary course of the disease (sedimentation rate, temperature increase, days of hospitalization) and, on the other hand, the later occurrence of pain or discomfort, limitation of motion, development of caput magnum or other radiological "abnormalities" in the originally affected hip. Altogether 12 (16.4 per cent) of the 73 patients reported some pain or discomfort from one of the hips, of which 9

(12.3 per cent) located their troubles to the previously diseased hip. From a clinical point of view the complaints were mild and only the patient described above had sought medical advice.

It cannot be excluded, however, that these symptoms were very early signs of osteoarthritis (Danielsson 1964) although the roentgenographic examination gave little support to this (Tables 3 and 8).

Table 9. Correlation between subjective complaints, observed radiographic changes, and limitation of motion.

			Femoral head				*Femoral neck*	*Acetabulum*			
		Patient no.	Narrow joint space	Caput magnum	Osteophytes	Dense spots	Cysts	Dense spots	Calcific	No. observed changes at X-ray	Motion restricted (no. directions)
Some starting stiffness and discomfort	all prev. diseased	1.							+	1	0
		2.								0	0
		3.							+	1	0
		4.				+				1	1
Occasional pain walking	prev. diseased hip	1.	+				+			2	0
		2.							+	1	1
		3.	+							1	1
		4.							+	1	3
	prev. unaffected hip	1.			+					1	0
		2.			+					1	1
		3.						+		1	1
Pain sometimes also at rest	prev. diseased hip	1.		+	+		+			3	5

Restriction of motion occurred in 18 of the 67 patients examined. Of these 15 (22.4 per cent) were restricted in the previously diseased hip. As seen from Table 9 only two patients of those with subjective complaints exhibited limitations in more than 1 direction. This also occurred in another 4 patients without subjective symptoms, but in none except the previously mentioned girl was this of clinical significance. This patient was also the only one showing a slight limp. The localization of the restricted motion to the previously diseased hip was statistically significant.

According to Danielsson (1964) the diagnosis of osteoarthritis of the hip must be based on radiographic structural or joint space changes, whereas osteophytes appear to be part of the normal ageing in the hip joint. The structural changes in the form of dense spots and cysts found in the present material are not identical with those seen in osteoarthritis. In this condition irregular areas of hyperdensity are seen between sharply delineated cysts of varying sizes, located mainly near the joint surface.

The dense spots seen in our material are rounded and sharply delineated, and correspond in form and size to those not uncommonly seen in the epiphysis of long tubular bones. Patho-anatomically they contain compact spongious bone (Schmorl 1931). The cysts registered in this material are smaller, not as sharply delineated, and more centrally located than those seen in coxarthrosis.

Joint space narrowing was seen in the previously diseased hip in three subjects. This incidence is not significantly increased compared with the controls (Table 8).

According to Schmid & Halden (1949), the epiphyses in the two hip joints show a symmetrical evolution. An acceleration of growth of the femoral head may occur as a response to a non-specific irritation of the growing hip joint. This might result in caput magnum.

Ferguson & Howorth (1934) and Murray (1947) have, among others, described this feature following synovitis of the hip joint. In our material the incidence of caput magnum in the previously diseased hip was significantly higher than in the controls (7 versus 0, $p < 0.05$).

Since the true cause of transient synovitis of the hip is unknown, it is from a statistical point of view not permissible to compare the

Table 10. Frequency of different radiological changes at follow-up in the previously diseased and the unaffected hip in 67 patients and in 36 subjects with no history of hip joint disease (controls).

	Patients		Controls
	Prev. diseased hip (67)	Prev. unaffected hip (67)	(72)
No change observed	27	38	45
1 type of change	26	24	19
2 different types of change	6	4	7
3 different types of change	8	1	1

radiographic findings in the previously diseased and previously unaffected hip in the same patient.

Such a comparison can, however, be made with the 72 hip joints in the control subjects, who had no history whatsoever of hip joint disease.

As seen from Tables 8 and 10 the number of radiographically negative previously diseased hips were 27 out of 67, in the previously unaffected hips 38 out of 67, and in the controls 45 out of 72. The incidence of different changes registered in the patients and the controls is seen in Table 8. A statistical analysis comparing the incidence of each specific change in the previously diseased hips with that in the controls and the previously unaffected hips with the controls showed a statistically significant higher frequency of caput magnum in the previously diseased hip.

The structural changes seen in the femoral neck in the forms of cysts and dense spots are also significantly more frequent in the previously diseased hip than in the controls ($p < 0.05$). The dense spots and cysts reported here differ from those seen in osteoarthritis.

The other changes concomitant with osteoarthritis, e.g. joint space narrowing and osteophytes, are not seen in an increased frequency in the present material as compared to the controls. Thus, from a strict roentgenographic point of view the present study has not supported the suggestions of Ferguson & Howorth (1934), Harrison, Schajowicz & Trueta (1953), Valderrama (1963), and Holenstein (1966) that a previous transient synovitis might predispose to early osteoarthritis of the hip.

On the other hand, a caput magnum which could be regarded as a change of epiphysial growth was seen significantly more frequently in the previously affected hip than in the controls. No instance of broadening of the femoral neck as reported by Holenstein (1966) was seen in this material.

The reason for the significantly increased frequency of femoral neck cysts and dense spots in the previously affected hips is uncertain but there is no evidence that they are of any clinical importance (Table 9).

There were no statistically significant differences with respect to the radiographically recorded changes between the previously unaffected hips and the controls.

When the number of hips with one or more radiographically registered changes is tabulated in the different groups as in Table 10, it is seen that those hips with more than two different radiological changes

were significantly more frequent in the previously diseased hip than in the controls. The previously unaffected side did not differ from the controls.

Thus, the present investigation has demonstrated that the clinical and radiological sequelae of a previous transient synovitis are few and relatively mild.

SUMMARY

Of 102 patients with transient synovitis of the hip treated in 1945, 1946, and 1947 in the Hospital for Sick Children, Göteborg, 67 have been subjected to a clinical and roentgenological follow-up; 6 additional patients were traced and responded to a questionnaire; another 6 patients had developed coxa plana (Perthés disease) and were excluded. Thus, altogether 76 per cent of those with transient synovitis were followed 20–22 years. Statistically the conclusions drawn from the present material should be representative.

The 6 per cent incidence of coxa plana in patients with the previous diagnosis of transient synovitis agrees with figures reported earlier. The incidence of reported allergic manifestations (16 per cent) in this material is not significantly higher than in a general Swedish population. Altogether 12 of the 73 subjects questioned reported some pain or discomfort from one hip. Of these 9 (12 per cent) located their troubles to the previously diseased hip. In only one patient (1 per cent) was the pain of clinical importance. This 35-year-old female was the oldest in the material, and had a prolonged initial course of the disease, as well as a recurrence two years later.

At follow-up she exhibited a limp, restricted motion in several directions, and a coxa magna on the radiograms.

Of the 67 subjects who personally attended the clinical and radiological follow-up, 18 exhibited some limitation of motion (10–20°). Of these 15 (22 per cent) were restricted in the previously diseased hip, giving a statistically significant correlation. In only the one female mentioned, however, was the limitation of motion of clinical importance.

The radiological changes seen in the 67 subjects include joint space narrowing, caput magnum, osteophytes and dense spots in the femoral head, cysts and dense spots in the femoral neck, and calcifications and os acetabuli near the acetabulum.

Since known normal roentgenological standards for the hip in this age group were lacking, a separate roentgenographic study has been

included of 72 hips in 36 previously healthy subjects of comparable ages.

A comparison between the 67 previously diseased hips and the 72 control hips revealed a statistically significant increase of caput magnum and cysts and dense spots in the femoral neck in the previously diseased hips. The same comparison between the 67 previously unaffected hips and the 72 control hips did not show any significant difference. The number of hips with three, but not one or two, different radiological changes was significantly higher among the previously diseased hips than among the control hips.

Caput magnum is the probable sequelae of an unspecific irritation to the growing hip joint. In this material neither this change nor the cysts and the dense spots in the femoral neck were found to be of importance for pain or restricted motion.

The different radiological changes generally discussed as typical of osteoarthritis were either not seen at all in this material (degenerative cysts and sclerosis) or they were equally common in the previously diseased hip and the controls (joint space narrowing and osteophytes).

This 20-year follow-up study has demonstrated that the clinical and radiological sequelae of a previous transient synovitis are few and relatively mild.

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