

CALVÉ PERTHES DISEASE, RESULTS OF OUT-PATIENTS TREATMENT

By

INGE REIMANN

The purpose of this study is to investigate, whether the results of out-patient weight relieving treatment of patients with Calvé Perthes disease are equally as good, as the results which are obtained from treatment with lengthy bed rest.

Since the disease was described around 1910 as a separate entity, it has been the subject of detailed studies. First after the introduction of the X-ray into diagnostics, the disease became distinct from other hip diseases, especially tuberculous coxitis.

In 1909 Waldenström (25) described some cases, which both clinically and radiologically correspond with the picture of disease now designated as Calvé Perthes disease.

Similarly in 1909 the American Legg described some cases of hip disease in children, which were clearly distinct from tbc. coxitis. In 1910 both Calvé (5) and Perthes (18) described some cases and in 1913 Perthes (18) recorded it as a well-defined disease with the name: Osteochondritis deformans juvenilis coxae.

Since then countless cases have been reported.

The series:

31 patients with Calvé Perthes disease form the material for this study, all treated at the State Hospital of Sønderborg, in the surgical department during the years 1948–1955 and followed-up 1958/1959, at the earliest 3½ years and at the latest 10 years after commencement of treatment.

The patients are followed-up regularly both with clinical and roentgenological examination.

Etiology:

In the etiology special interest was paid to trauma, endocrine diseases

and hereditary dispositions. Information about trauma of an acceptable character in the anamnesis can only be provided in 4 cases. Nothing definite was found from an endocrinous point of view, however, one of the patients was previously treated for myxoedemia. In 4 cases, at the first examination, the nutritional state was found to be considerably above average. Only in 2 cases could any information be obtained about hip disease in the family, one of the patients has a brother, who has had epiphysiolysis coxae, and one has an aunt, who has had congenital hip luxation; no case of Calvé Perthes disease has occurred in the family.

Sex distribution follows the norm, for there is a clear preponderance of boys; thus 23 of the patients are boys, which equals 74 % and 8 of the patients are girls (26 %).

The cases are divided into 13 right-sided, 16 left-sided and 2 bilateral cases.

The patients' age at the onset of disease varies from 3–14 years, with an average age of 7 years, most are about 5 years:

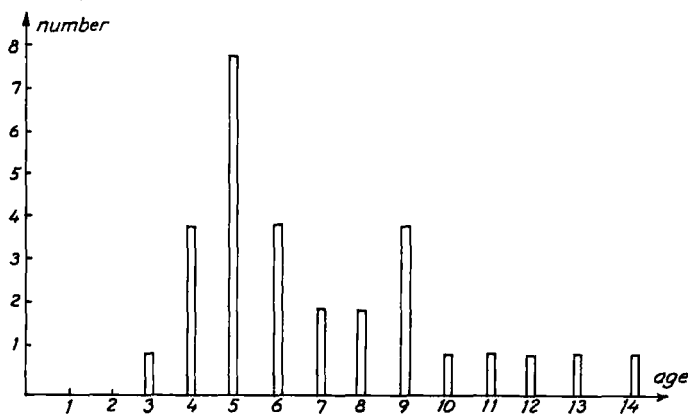


DIAGRAM 1

The clinical picture is typical in all cases, beginning with limping and slight limitation of movement. In 29 of the cases the first symptom was slight limping, in 5 cases there was pain in the hip from the beginning, and in 2 cases pain in the knee.

In the majority of the cases the first clinical examination took place within the first half year after the onset of symptoms, but otherwise the period between the onset of symptoms and the first examination varied from 1 week to 2 years:

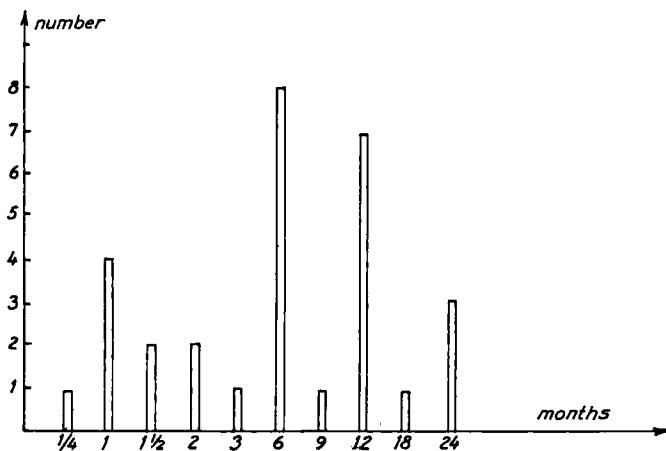


DIAGRAM 2

At the first clinical examination the following were found:

limping in 29 cases;

pain on walking in 7 cases;

Trendelenburg test positive in 5 cases;

shortening in 5 cases, varying from $\frac{1}{2}$ to $1\frac{1}{2}$ cm.;

atrophy in 23 cases, very often femoral atrophy, crus atrophy only in 3 cases (found amongst patients with femoral atrophy).

Mobility:

completely free mobility in the hip in 3 cases;

limited abduction and rotation in 21 cases;

limited rotation (very often inward rotation) in 4 cases;

contracture in 3 cases.

With regard to the treatment of patients in this series the following groups can be established:

1) Exclusively out-patient treatment with weight relief using the Thomas splint: 5 patients.

2) Stay in hospital, until the diagnosis is made, afterwards out-patient treatment with the Thomas splint and regular control both clinically and by X-ray. For these patients the hospital stay lasted on average 2 weeks. (One patient, however, had first a lengthy hospital stay owing to treatment for congenital hip luxation on the same side): 17 patients.

3) Those treated first with extension, owing to contracture at the first examination, afterwards given out-patient treatment with weight-

relief, using the Thomas splint. Stay in hospital was on average 4 weeks: 3 patients.

4) Bilateral cases: one patient transferred to "Refsnaes" and treated there with $1\frac{1}{2}$ years bed rest, one patient treated with $\frac{1}{2}$ year's bed rest at home, afterwards out-patient weight-relief, using the Thomas splint, as the one side was only slightly affected: 2 patients.

5) First treated elsewhere (Refsnaes) with bed rest for 7 months, afterwards transferred here and treated with out-patient weight relief, using the Thomas splint: 1 patient.

6) Symptomatic treatment, since on admission there were old changes not susceptible of treatment: 3 patients. The patients in groups 4, 5 and 6 (in all 6 patients) are not included with those given exclusively out-patient treatment with the Thomas splint.

The treatment with the Thomas splint lasts on average $2\frac{1}{2}$ –3 years. The patients come for frequent examinations about every 3 months both clinically and by X-ray, and the treatment by Thomas splint continues until there is radiological healing. The check-up is made at the surgical ambulatorium, repair and possible renewal of the splint is undertaken at the Invalid Institute workshop; we are not given the impression that the patients have omitted to use the splint.

On re-examination the following was found:

All patients state they are free of pain, however, 2–3 patients admit a feeling of tiredness after a fairly long period of weight-bearing and walking.

5 patients state there is a slight limp sometimes.

The Trendelenburg test was negative in all cases.

Shortening was found in 13 patients (on average $\frac{1}{2}$ –1 cm., one with 3 cm.).

In scarcely half the patients was there atrophy; femoral atrophy in 12 (on average 1–2 cm., one with 5 cm., however), crus atrophy in 8 of the 12 (on average $\frac{1}{2}$ –1 cm., with one 3 cm.).

The findings for mobility were:

complete freedom of mobility in 10 patients,

limited abduction and rotation in 16,

limited rotation in 2, no case of contracture.

At the re-examination all patients were found to carry on their work or school activities without hindrance; $\frac{1}{3}$ of the patients take part in gymnastics and sport. 17 were children still going to school, otherwise the remainder were employed in various trades: 3 worked on the land, there were 2 butcher apprentices, 1 office clerk, 3 machine apprentices,

1 cook and 1 electrical apprentice. Those patients employed in hard manual labour were advised to change their work.

None of the patients had completed their military service, since those who had been called up were all rejected. Radiological changes were noticed, and it was decided that the heavy weight-bearing which they would be exposed to would increase the risk of secondary arthrosis.

The radiological results showed changes from spherical-shaped to severely deformed capita; none of the results were 100 % normal by comparison with the healthy side, but none revealed signs of secondary arthrosis.

In order to evaluate the radiological changes more closely, methods of measurement were employed, as described by the Americans Herndon and Heymann in 1950.

4 quotients are calculated:

1) To express the flattening and increase in breadth of the head, a caput quotient (caput-epiphysis quotient) is recorded, in which the relationship between the height and width of the caput epiphysis is expressed in %, and calculated by comparison with the healthy side. The quotient is not pathological until it is below 85 %.

2) To express the changes which may arise in the collum, in both increase in breadth and shortening, a head-neck quotient is recorded and calculated as the relationship between: the distance from the border of the collum facing the diaphysis to the top of the caput, and the breadth of the collum, and is expressed in % and calculated in relation to the healthy side.

3) The increase in breadth and flattening which may occur in the acetabulum is expressed as an acetabular quotient. This is calculated as the relationship between the depth of the acetabulum and the breadth of the acetabulum, expressed in %, and calculated in relation to the healthy side.

4) Finally a caput-acetabular quotient is recorded as an expression of the subluxation of caput, for the increase in breadth of the caput has the effect that the caput is not laterally covered by the acetabulum: this quotient is calculated as the relationship between: the distance between the caput medially and the acetabulum laterally, and the distance between the caput medially and the caput laterally in % (between vertical lines), and calculated in relation to the healthy side.

In the present series, when calculating the quotients of those patients exclusively treated as out-patient with Thomas splint it was found:

The caput-epiphysis quotient was 65 % on average: those patients

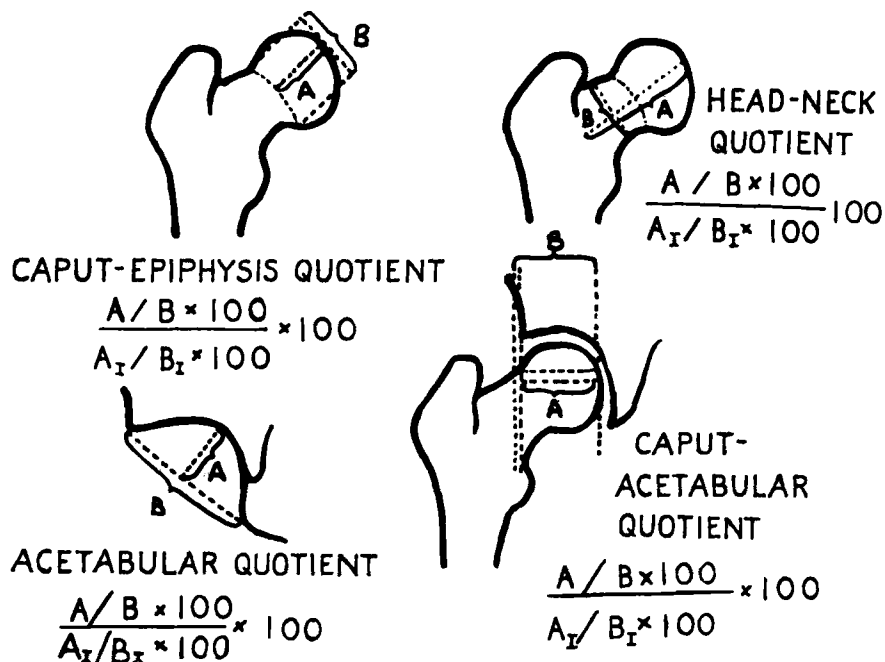


Fig. 1.



Fig. 2.

No. 23. Boy aged 5, symptoms for 3 months. Increased joint width. 10/3/55.

who at the first examination showed pronounced, advanced radiological changes were omitted; in all, 4 patients were involved and these patients all had symptoms 1-2 years before treatment began.

The head-neck quotient was on average: 84 %.

The acetabular quotient was on average: 88 %.

The caput-acetabular quotient was on average: 85 %.



Fig. 3.
No. 23. 8/3/56.



Fig. 4.
No. 23. 8/3/56. Lauensteins' projection, pronounced changes.

The comparison of the results stated by the various authors is made difficult by the use of different principles of evaluation.

The problem in the treatment is still how long and how effectively the patients ought to be treated with bed rest and weight relief. There seems to be agreement that the younger the patient and the earlier he comes for treatment, the better will be the results.

In 1924 Flemming Møller (15) published 72 cases in his thesis. The treatment was symptomatic with 1-2 months bed rest, and in cases of contracture treatment by traction. Flemming Møller recommends that



Fig. 5.

No. 23. 7/8/58. Caput-epiphysis quotient 88 %. Head-neck quotient 98 %, acetabular quotient 98 %, caput-acetabular quotient 95 %.



Fig. 6.

No. 15. Boy aged 7, symptoms for $\frac{1}{2}$ year. Increased width of joint and flattening. 2/3/53.

thyroidin treatment always be tried. The results are evaluated according to the clinical and roentgenological changes.

As the first to introduce methods of measurements in the evaluation of the radiological end-results, Eyre-Brook brought in the term caput-index, in order to obtain a mathematical expression for the flattening and increase in breadth of the caput. Caput-index refers to the relationship between the height and breadth of the caput epiphysis, expressed



Fig. 7.
No. 15. 14/8/53.



Fig. 8.
No. 15. 18/7/58. Caput-epiphysis quotient 68 %, head-neck quotient 83 %, acetabular quotient 75 %, caput-acetabular quotient 93 %.

in %. Eyre-Brook records normal values and reports those for children under 7 years to be 45 %–55 %, for children over 7 years 35 %–45 %. In 1936 he published a series of 41 patients from The Royal National Orthopedic Hospital. The patients were divided into groups, according to both age (over or under 7 years) and treatment either traction in bed 1–2 years, or out-patient weight relief. After calculation of the caput index the group under 7 years obtained the best results after



Fig. 9.

No. 1. Girl aged 5, symptoms for 1½ years. 23/10/48.

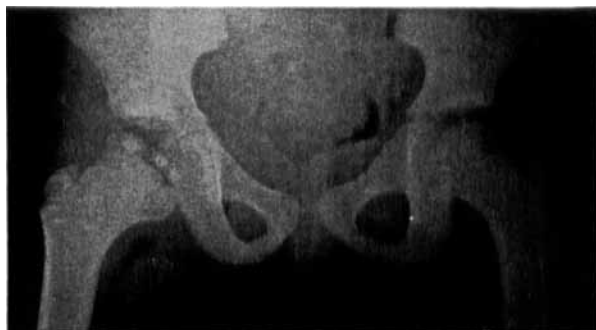


Fig. 10.

No. 1. 27/5/49.

traction in bed, while the group over 7 years obtained approximately equally good results from the two groups.

Sundt (24) concluded in 1949 from a series of 153 patients that the results of the untreated and the treated cases were identical. But none of the patients in Sundt's series was treated consistently, either with lengthy bed rest or with lengthy out-patient weight relief (maximum ½ year bed rest). 65 of the 153 patients were not treated and 88 were treated; the treatment was symptomatic, very often only a few months' bed rest. The results are reported as good, fairly good and poor according to the caput's shape.

In 1951 Mindell and Sherman (13) published 73 cases from The Department of Surgery, University of Chicago. The patients were treated



Fig. 11.

No. 1. 18/7/58. Caput-epiphysis quotient 43 %, head-neck quotient 64 %, acetabular quotient 78 %, caput-acetabular quotient 83 %.



Fig. 12.

No. 8. Boy aged 7. Symptoms for $\frac{1}{2}$ year. 29/3/49.

partly with lengthy bed rest partly with lengthy out-patient weight relief. The results of the two principles of treatment were stated to be equally good and were recorded in 3 groups according to the following criteria: 1) good, i.e., symptom-free, few degrees of limitation in rotation and abduction, slight muscle atrophy. X-rays show no deformity, and good congruence of the articular surfaces. 2) fairly good, i.e., pain with lengthy weight-bearing, 1–2 cm. shortening, slight atrophy. The X-ray showed moderate flattening and increase in width of the caput, slight irregularity of the caput, possibly slight irregularity of the aceta-

*Fig. 13.*

No. 8. 13/5/50.

*Fig. 14.*

No. 8. 29/7/58. Caput-epiphysis quotient 78 %, head-neck quotient 89 %, acetabular quotient 100 %, caput-acetabular quotient 69 %.

bulum and a rather short and broad collum. 3) Poor, i.e., pain and limp, up to 4 cm. shortening, considerable atrophy, limited rotation and abduction. The X-ray shows severe deformation of caput, collum and acetabulum.

McCarrol and Pedersen (19) (from the Shriners Hospital for Crippled Children & The Department of Surgery, Washington University School of Medicine, St. Louis) compare also 2 groups of similar patients, each group numbering 12 patients, the one group treated with traction in bed (1-2 years), the other group treated with out-patient weight relief (2-3

years). The best results come from patients treated with traction in bed; the results are given by the caput index: for patients treated with traction in bed, index 37.6 %, for patients treated with out-patient weight relief, 25.3 %.

1952, Herndorn and Heymann (12) published a series of 41 patients from The University Hospital, Cleveland, who were treated first with traction in bed for an average period of 6 months until regeneration commenced, then with out-patient weight relief using the Thomas splint, until there was radiological healing. The following results are stated:

The caput quotient averages 66.9 % (47.7–100).

The head-neck quotient averages 86.7 % (72–100).

The acetabular quotient averages 88.6 % (70–100).

The caput-acetabular quotient averages 89.3 % (73–100).

In his thesis of 1953, dealing with 204 patients, Helbo (11) recommends treatment with lengthy bed rest (ca. 1 year), then out-patient treatment with crutches and Snyder's sling. 66 patients were followed-up with this treatment, and the results of the clinical and radiological changes are stated. An average caput-quotient of 67 % is reported. The results of the untreated and the symptomatic-treated cases are reported to be equally with an average caput quotient of 40 %. Helbo states that 25 % of the untreated cases will be symptom-free at the primary healing, but the caput will often be somewhat deformed, so there is great risk of secondary arthrosis.

In 1958 Evans and Lloyd Roberts (9) compared 2 groups of identical patients, each group of 24 patients; the one group was treated with traction in bed, the other with out-patient weight relief, with crutches and Snyder's sling. (From The Royal National Orthopedic Hospital, London). They concluded that the results of the 2 principles of treatment were equally good, and the results were reported as good, fairly good and poor, since both the clinical and radiological changes were taken into consideration.

In 1959, Wansbrough, Carrie, Walker & Ruckerbauer (26) published from The Research Institute of the Hospital for Sick Children, Toronto, a large series of 129 patients. Out-patient treatment with Taylor's splint is recommended. The results of both the clinical findings and the radiological findings are given; quotients are calculated as described by Herndon and Heymann.

Remvig (20) published 1959 some previous results following lengthy weight relief treatment during bed rest. The series consisted of 20 patients and the results were stated according to the clinical and radiological changes. 80 % good and 20 % poor results were found.

Author	Year	No. pat.	Treatment	Results
Fl. Møller	1924	72	symptomatic, 1-2 months bed rest, thyroidin.	clinical and radiological, good and poor.
Eyre-Brook	1936	41	1) traction in bed. 2) out-patient weight relief.	caput index under 7 years 1) = better: over 7 years 1) & 2) almost equally good.
Sundt	1949	153	symptomatic, interrupted bed rest, max. ½ year.	good, fairly and poor, clinical and radiol. Untreated = treated.
Mindell & Sherman	1951	73	1) lengthy bed rest. 2) out-patient weight relief.	good, fairly and poor. equally good results from and 1) and 2).
McCarroll & Pedersen	1951	24	1) traction in bed. 2) out-patient weight relief.	caput index. 1) 37.6 %. 2) 25.3 %.
Herndon & Heymann	1952	41	traction in bed, average 6.3 mths., then out-pat. relief with Thomas splint.	caput quotient: 66.9 %, head-neck quot.: 85.7 % acetabular quot.: 88.6 % caput acetabular quotient: 89.3 %.
Helbo	1953	66	bed rest, about 1 yr. then out-patient weight relief with Snyder's sling.	clinical and radiological. caput quotient: 67 %.
Evans & L. Roberts	1958	48	1) traction in bed. 2) out-pat. weight relief with Snyder's sling.	good, fairly and poor. 1) and 2) equally good results.
Wansbrough, Carnie, Walker & Ruckerbauer	1959	129	out-patient weight relief with Taylor's splint.	excellent, good, fairly, and poor, clinical and radiological quotients.
Remvig	1959	20	lengthy bed rest.	good 80 %, poor 20 %.

CASE HISTORIES

No. 1: Out-patient, girl aged 5, reporting symptoms for 1½ years before treatment began. 1. X-ray shows pronounced changes with obvious flattening and fragmentation of the caput epiphysis. She was treated with the Thomas splint for 2 years. The re-examination showed 1 cm. shortening and limited abduction and rotation. Caput quotient 43 %, head-neck quotient 64 %, acetabular quotient 78 % and caput-acetabular quotient 83 %.

No. 2: Out-patient, boy aged 4, reporting symptoms for ½ year before treatment. 1. X-ray shows increase in joint width and initial flattening. Treated with Thomas splint for 3 years. At the re-examination complete freedom of movement was found. Caput quotient 80 %, head-neck quotient 100 %, acetabular quotient 100 % and caput-acetabular quotient 95 %.

No. 3: Out-patient, boy aged 7, reporting symptoms for 1½ months before treatment. 1. X-ray shows increase in joint width and initial flattening. Treated with Thomas splint for 2 years. At the re-examination he was symptom-free, with free mobility in the hip. Caput quotient 88 %, head-neck quotient 95 %, acetabular quotient 100 % and caput-acetabular quotient 100 %.

No. 4: Out-patient, boy aged 6, reporting symptoms for ½ year before treatment. 1. X-ray shows increase in joint width and initial flattening. Treated with Thomas splint for 3 years. At the re-examination 1 cm. shortening was found, with free mobility of the hip. Caput quotient 78 %, head-neck quotient 94 %, acetabular quotient 88 %, caput-acetabular quotient 97 %.

No. 5: Out-patient, boy aged 9, reporting symptoms for several years. 1. X-ray shows flattening and some irregularity. Treated with Thomas splint for 5 years. At the re-examination 1 cm. shortening was found, limited abduction and rotation. Caput quotient 56 %, head-neck quotient 58 %, acetabular quotient 85 % and caput-acetabular quotient 80 %.

No. 6: J. no. 796/49, girl aged 4, reporting symptoms for 1 month before treatment. 1. X-ray shows increase in joint width and slight flattening. Treatment with Thomas splint was given for 1½ years. At the re-examination the patient was symptom-free, there was free movement of the hip. Caput quotient 70 %, head-neck quotient 84 %, acetabular quotient 100 % and caput-acetabular quotient 100 %.

No. 7: J. no. 1225/49, boy aged 9. He reported symptoms for 1 month (after trauma) before treatment. 1. X-ray shows increase in joint width and slight flattening. Treated with Thomas splint for 4 years. At the re-examination slight femur and crus atrophy together with limited abduction and rotation. Caput quotient 50 %, head-neck quotient 70 %, acetabular quotient 100 % and caput-acetabular quotient 82 %.

No. 8: J. no. 839/49, boy aged 7. 1. X-ray shows increase in joint width and slight flattening. Treated with Thomas splint for 3 years. At the re-examination there was limited rotation, otherwise natural conditions. Caput quotient 78 %, head-neck quotient 89 %, acetabular quotient 100 % and caput-acetabular quotient 69 %.

No. 9: J. no. 1485/50, boy aged 8, reporting symptoms for ½ year before treatment. 1. X-ray shows increase in joint width and slight flattening. Treated with Thomas splint for 2 years. On re-examination here 1 cm. shortening was found, with 1 cm. femur atrophy, limited abduction and rotation. Caput quotient 50 %, head-neck quotient 80 %, acetabular quotient 87 % and caput-acetabular quotient 100 %.

No. 10: J. no. 682/51, girl aged 6. Reporting symptoms for $\frac{3}{4}$ year before treatment. 1. X-ray shows increased width in joint and initial flattening. On re-examination limited abduction and rotation were found. Caput quotient 57 %, head-neck quotient 54 %, acetabular quotient 84 % and caput-acetabular quotient 88 %.

No. 11: J. no. 1208/51, 12 year old boy, reporting symptoms for 1 year before treatment. 1. X-ray shows increase in joint width and slight flattening. Treated with Thomas splint for $3\frac{1}{2}$ years. On re-examination 1 cm. shortening was found, with limited abduction and rotation. Caput quotient 60 %, head-neck quotient 83 %, acetabular quotient 95 % and caput-acetabular quotient 95 %.

No. 12: J. no. 1852/52, boy aged 9, reporting symptoms for 1 year before treatment began. 1. X-ray shows pronounced changes, with flattening, breaking-up and fragmentation. Treated with Thomas splint for $3\frac{1}{2}$ years. On re-examination 1 cm. shortening was found, 2 cm. femur and 1 cm. crus atrophy together with limited abduction and rotation. Caput quotient 45 %, head-neck quotient 81 %, acetabular quotient 80 % and caput-acetabular quotient 69 %.

No. 13: J. no. 507-53, boy aged 6. Reporting symptoms for $\frac{1}{2}$ year. 1. X-ray shows initial flattening and sclerosis. Treated with Thomas splint for $4\frac{1}{2}$ years. On re-examination 1 cm. femur atrophy and limited abduction and rotation. Caput quotient 57 %, head-neck quotient 88 %, acetabular quotient 91 %, caput-acetabular quotient 98 %.

No. 14: J. no. 1759/53, girl aged 3. Previously treated for congenital luxation of the hip. 1. X-ray shows increase in joint width and initial flattening. Treated with Thomas splint for 2 years. On re-examination free mobility of the hip was found. Caput quotient 50 %, head-neck quotient 95 %, acetabular quotient 100 % and caput-acetabular quotient 62 %.

No. 15: J. no. 288/53, boy aged 6. Reported symptoms for $\frac{1}{2}$ year (after trauma) before treatment. 1. X-ray shows initial flattening and increase in joint width. Treated with Thomas splint for 4 years. On re-examination $1\frac{1}{2}$ cm. femur atrophy and limited rotation. Caput quotient 68 %, head-neck quotient 83 %, acetabular quotient 75 % and caput-acetabular quotient 93 %.

No. 16: J. no. 1096/55, boy aged 5. Reported symptoms for $\frac{1}{2}$ year before treatment. (After trauma). 1. X-ray shows increase in joint width and initial flattening. Treated with Thomas splint for 3 years, on re-examination $1\frac{1}{2}$ cm. shortening was found, 5 cm. femur and 1 cm. crus atrophy, free mobility. Caput quotient 68 %, head-neck quotient 100 %, acetabular quotient 95 % and caput-acetabular quotient 95 %.

No. 17: J. no. 1955/55, boy aged 5. Reported symptoms for 1 week before treatment. 1. X-ray shows increase in joint width and initial flattening. Treated with Thomas splint for $2\frac{1}{2}$ years. On re-examination free mobility was found, 1 cm. shortening and 2 cm. femur together with 1 cm. crus atrophy. Caput quotient 74 %, head-neck quotient 100 %, acetabular quotient 95 % and caput-acetabular quotient 84 %.

No. 18: J. no. 1874/49, boy aged 8. Reported symptoms for $\frac{1}{2}$ year before treatment. 1. X-ray shows joint width and flattening; treated first with Thomas splint for $1\frac{1}{2}$ years, then admitted for traction treatment for 6 weeks owing to contracture, then again treated with Thomas splint for $1\frac{1}{2}$ years. On re-examination 1 cm. shortening was found, with $1\frac{1}{2}$ cm. femur and $\frac{1}{2}$ cm. crus atrophy, as well as limited abduction and rotation. Caput quotient 47 %, head-neck quotient 67 %, acetabular quotient 80 % and caput-acetabular quotient 80 %.

No. 19: J. no. 2079/55, boy aged 11. Reported symptoms for several years, before treatment began. 1. X-ray shows increase in joint width and flattening; treated with Thomas splint for 2 years. On re-examination limited abduction and rotation were found. Caput quotient 58 %, head-neck quotient 77 %, acetabular quotient 93 % and caput-acetabular quotient 98 %.

No. 20: J. no. 813/51, girl aged 5, reporting symptoms for 2 months before treatment. 1. X-ray shows increase in joint width and initial flattening. Treated with Thomas splint for 3 years. On re-examination slight limping, 1½ cm. shortening, 1 cm. crus atrophy (previously poliomyelitis with pareses of right leg), limited abduction and rotation. Caput quotient 50 %, head-neck quotient 78 %, acetabular quotient 80 % and caput-acetabular quotient 94 %.

No. 21: J. no. 1004/48, girl aged 9. Reported symptoms for 1 year before treatment. 1. X-ray shows pronounced changes with flattening and fragmentation. Treated with Thomas splint for ½ year first, then she was admitted for traction treatment for 3 weeks owing to contracture, then again treated with Thomas splint for 2½ years. On re-examination 1½ cm. shortening was found, 2 cm. femur and 1 cm. crus atrophy as well as limited abduction and rotation. Caput quotient 45 %, head-neck quotient 75 %, acetabular quotient 100 % and caput-acetabular quotient 83 %.

No. 22: J. no. 1257/51, boy aged 14, reported symptoms for fully 2 years; 1. X-ray shows considerable changes with flattening and deformation. Treated first with traction for 4 weeks, owing to contracture, then given out-patient treatment for ½ year, again admitted for traction treatment for 4 weeks, then treated as an out-patient with the Thomas splint for 1½ years. On re-examination 3 cm. femur atrophy was found, limited abduction and an absence of rotation. The patient declares he is free of pain. Caput quotient ca. 21 %, head-neck quotient 78 %, acetabular quotient 80 %, caput-acetabular quotient 75 %.

No. 23: J. no. 455/55, boy aged 5; reported symptoms for 3 months before treatment. 1. X-ray shows increase in joint width and initial flattening. Treated first with traction for 3 weeks owing to contracture, then given out-patient weight relief with Thomas splint for 3 years. On re-examination free mobility was found, with 2 cm. femur and 1 cm. crus atrophy. Caput quotient 88 %, head-neck quotient 98 %, acetabular quotient 98 % and caput-acetabular quotient 95 %.

No. 24: J. no. 1038/49, boy aged 10; reported symptoms for 1 year (after trauma) before treatment. 1. X-ray shows increase width in joint and flattening. Treated with Thomas splint first for ½ year, then admitted owing to contracture and treated with traction for 6 weeks, then treated again with Thomas splint for 2½ years. On re-examination ½ cm. shortening was found, 2 cm. femur atrophy and free mobility. Caput quotient 71 %, head-neck quotient 85 %, acetabular quotient 100 %, and caput-acetabular quotient 80 %.

No. 25: J. no. 1465/47. 14 year old boy. Reported symptoms for 1 year before treatment. 1. X-ray shows increased joint width. First treated with Thomas splint for ½ year, then treated by traction for 6 weeks, then again by Thomas splint. Operated on later, subtrochanteric osteotomy owing to ankylosis in the adduction contracture. Re-examined ½ year afterwards, when there was no trouble, 1½ cm. shortening and limited mobility. The patient did not wish to attend for follow-up examination.

No. 26: J. no. 2237/51, boy aged 5. Reported symptoms for 1 month before symptoms began. 1. X-ray shows flattening. He was treated elsewhere with 7-8 months

bed rest, transferred here and treated with Thomas splint for 2½ years; could not be traced after moving away.

No. 27: J. no. 2224/51, boy aged 4. Reported symptoms for 2 months before treatment. Bilateral case, treated with only ½ year's bed rest, then given out-patient weight relief with Thomas splint (the one side was only slightly attacked). At the re-examination limited abduction and rotation were found on both sides, otherwise normal conditions. X-ray shows moderate flattening on the left side, almost natural conditions on the right side.

No. 28: J. no. 1097/52, boy aged 5. Reported symptoms for 1 year before treatment began. Bilateral case, treated with bed rest for 1½ years (Refsnaes). At the re-examination limited abduction and rotation were found on both sides, X-ray shows the capita slightly flattened.

No. 29: J. no. 856/48, girl aged 4. Reported symptoms for 1½ months before treatment. First treated in Germany with plaster; 1. X-ray shows flattening and sclerosis. Treated symptomatically here. Not examined (living in Rostock) but information by post stated: no subjective trouble.

No. 30: J. no. 1829/48, girl aged 5. Reported symptoms for 1 month. Treated first elsewhere with bed rest and traction for several months, treated here symptomatically. At the re-examination 1 cm. shortening, limited abduction and rotation. Caput quotient 35 %, head-neck quotient 58 %, acetabular quotient 74 % and caput-acetabular quotient 69 %.

No. 31: J. no. 1900/48, boy aged 13, symptoms for 1 year. 1. X-ray shows flattening and rarefaction in the collum. Treated symptomatic and as an out-patient. At the re-examination limited abduction and rotation were found; Caput quotient 62 %, head-neck quotient 97 %, acetabular quotient 82 % and caput-acetabular quotient 90 %.

CONCLUSION

In the present series the results obtained from the out-patient weight relief treatment of Calvé Perthes disease with the Thomas splint, (results reported both clinically and by measurements of the radiological end-changes) were found to compare so equally with the results, reported from patients treated with bed rest of long duration; that the out-patient treatment can on this basis be recommended, corresponding with what other published series have demonstrated. Out-patient treatment is to be preferred on economic, social and psychological grounds, since the patients, who are very often boys aged 5-6 during the out-patient treatment, may remain at home, may take part in school activities, may be taken around amongst those of equal age; this is advantageous to their development, often retarded by lengthy bed rest and a stay in hospital, even if much is done to occupy and instruct them.

More uniform methods are to be desired in evaluating the results of the treatment, since one would like to have more knowledge of the difference apparent between the results of those patients given insuf-

ficient weight relief over a short period, and the patients treated with lengthy weight relief, either with bed rest or as out-patients; in addition, which form of lengthy weight relief is to be preferred.

S U M M A R Y

A re-examination of 31 patients treated for Calvé Perthes disease was made; 25 of these were treated as out-patients with lengthy weight relieving treatment (Thomas splint). The patients were regularly examined both clinically as well as with X-rays: treatment was extended until healing was noted on the X-rays.

Different methods of treatment and their results are discussed, including methods of measurements which evaluate the radiological end-changes and comparisons are drawn between the values recorded in the literature and the values found in the present series. The out-patient treatment is recommended as the results found seem to be equivalent to the results obtained following treatment with lengthy bed rest.

R E S U M E

31 malades traités pour la maladie de Calvé-Perthe ont été réexaminés; 25 d'entre eux ont été soumis à un traitement par soulagement du poids en longueur (attelle de Thomas) sans être alités. Les malades ont été régulièrement examinés aussi bien cliniquement qu'aux rayons X. Le traitement a été poursuivi jusqu'à ce que la guérison ait pu être enregistrée aux Rayons X.

Différentes méthodes de traitement et leurs résultats sont discutés, y compris les méthodes de mensuration pour évaluer les modifications radiologiques finales et des comparaisons sont faites entre les valeurs enregistrées dans la littérature et les valeurs trouvées dans la présente série. Il est recommandé de ne pas traiter les malades par l'alitement, étant donné que les résultats obtenus paraissent être équivalents à ceux obtenus à la suite d'un traitement avec très long alitement.

Z U S A M M E N F A S S U N G

Eine Nachuntersuchung von 31 Patienten, die wegen Calvé-Perthescher Erkrankung behandelt worden waren, wurde vorgenommen. 25 von diesen wurden als ambulatorische Patienten mittels langdauernder Entlastung (Thomas Schiene) behandelt. Die Patienten wurden regel-

mässig sowohl klinisch als auch röntgenologisch untersucht. Die Behandlung wurde so lange aufrechterhalten bis man röntgenologisch Heilung erkennen konnte.

Verschiedene Methoden der Behandlung und deren Ergebnisse werden besprochen, einschliesslich von Messungsmethoden, die die röntgenologischen Schlussveränderungen bewerten, und Vergleiche zwischen den in der Literatur und den in der gegenwärtigen Reihe gefundenen Werten werden gezogen. Die ambulatorische Behandlung wird empfohlen, da ihre Ergebnisse denen, die mittels langdauernder Bettruhe erreicht werden, ebenbürtig sind.

REFERENCES

1. *Arel, F.*: Spontannekrose des Schenkelkopfes bei Jugendlichen. Zentralblatt chir. 63, 617, 1936.
2. *Axhausen*: Die Nekrose des proximalen Bruchstücks beim Schenkelhalsbruch und Ihre Bedeutung für das Hüftgelenk. Arch. klin. chir. 120, 325, 1922.
Der anatomische Krankheitsablauf bei der Köhlerschen Krankheit und der Pertheschen Krankheit. Arch. klin. chir. 124, 511, 1923.
Epiphysennekrose und Arthritis deformans. Arch. klin. chir. 129, 341, 1924.
3. *Blumensaat, C.*: Über sekundäre Schenkelkopfnnekrosen nach traumat. Hüftgelenksverrenkungen. Arch. klin. chir. 185, 720, 1936.
4. *Büttner, G.*: Zur Ätiologie und Pathogenese der Pertheschen Krankheit. Arch. klin. chir. 136, 703, 1924.
5. *Calvé, J.*: Sur une forme particulière de pseudo-coxalgie. Rev. Chir. 30, 42, 1910.
6. *Ely, L.*: Leggs Disease. Annals of Surgery 1, 212, 1919.
7. *Eyre-Brook, A. L.*: Osteochondritis deformans coxae or Perthes Disease. Brit. Journal Surgery 24, 166, 1936/37.
8. *Evans, D. E.*: Legg Calvé Perthes Disease, a study of late results. The Journal of Bone and Joint Surgery Vol. 40 B, 2, 1958.
9. *Evans, D. E. & Lloyd Roberts, G. C.*: Treatment in Legg Calvé Perthes Disease. a comparison of in-patient and out-patient methods. The Journal of Bone and Joint Surgery, Vol. 40 B, 2, 1958.
10. *Friederichsen, H.*: Tilfælde af Calvé Perthes sygdom. Ugeskrift for Læger 95, 905, 1933.
11. *Helbo, S.*: Morbus Calvé Perthes, specielt med henblik paa behandlingen. Disputats, København 1953.
12. *Herndon, C. H. & Heymann, C. H.*: Legg Perthes Disease. Journal Bone and Joint Surgery 32 A, 767, 1950, and 34 A, 23, 1952.
13. *Mindell, E. R. & Shermann, M. S.*: Late results in Legg Perthes Disease. Journal Bone and Joint Surgery 33 A, 1, 1951.
14. *Michelsen, K.*: 5 tilfælde af Calvé Perthes sygdom. Hospitalstidende 1137, 1914.
15. *Møller, Flemming P.*: Malum deformans coxae infantile. Disputats, København 1924.
16. *Nicolaysen, K.*: Malum coxae Calvé Perthes Leggs Pathogenese. Norsk Magasin for Lægevidenskab 92, 985, 1931.

17. *Nielsen, Børge*: Om Calvé Perthes Sygdom efter fractura colli femoris hos unge. Hospitalstidende 773, 1938.
18. *Perthes, G.*: Über Osteochondritis deformans juvenilis. Arch. klin. chir. 101, 779, 1913.
19. *McCarrol, H. R. & Pedersen, H. E.*: Treatment in Legg Perthes Disease. Journal Bone and Joint Surgery 33 A, 591, 1951.
20. *Remvig, O.*: Foreløbige resultater ved langvarig aflastningsbehandling af patienter med Mb. Calvé Perthes. Nordisk Medicin 19, 2, 1959.
21. *Severin & Nordentoft*: Et typisk tilfælde af Calvé Perthes sygdom. Hospitals tidende 1474, 1914.
22. *Sinding-Larsen*: Malum deformans coxae infantile. Norsk Magasin for Lægevidenskab 475, 1915.
23. *Sjövall, Helge*: Zur Frage der Behandlung des Coxae plana. Acta Orthopaedica Scandinavica 13, 324, 1942.
24. *Sundt, H. F.*: Malum coxae Calvé Legg Perthes. Acta chir. scandinavica 1949, Suppl. 148.
25. *Waldenström*: Coxa plana. Zentralblatt chir. 47, 539, 1920.
26. *Wansbrough, R. M., Carris, A. V., Walker, N. F. & Ruckerbauer, G.*: Coxa plana its genetic aspects and results of treatment with the long Taylor walking Caliper. The Journal of Bone and Joint Surgery Vol. 41 A, 1, 1959.