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EIGHT CASES OF
"PSEUDARTHROSE EXTRAARTICULAIRE"

The final outcome of a tuberculous coxitis, which Sorrel designates as extraarticular pseudarthrosis, is characterized by a complete destruction of the head and neck of the femur and an upward displacement of the femur, so that the medial part of the greater trochanter rests against the posterior lateral surface of the ilium. At the age of 6—7 years already the articular parts of the hip have developed to such an extent, and the spongiosa has become so firm and strong, that such a complete destruction of the upper end of the femur occurs but seldom. So extraarticular pseudarthrosis is nearly always a result of a coxitis that has commenced in early childhood, often a coxitis with primary luxation.

The clinical picture is characterized by a considerable shortening of the extremity, by faulty position and by preservation of mobility. The shortening often exceeds 5 cm. Usually the femur is kept in flexion and adduction, with a variable degree of rotation; and as a rule the thigh can be flexed, adducted and rotated outwards as well as inwards with the shaft of the femur as the axis of rotation. Passive mobility of the femur cranially and dorsally in relation to the ilium is a frequent phenomenon. As in other forms of coxitis with poor fixation in the hip, relapsing abscess formation and persistent fistula are common complications in extraarticular pseudarthrosis. Owing to the insufficient fixation between the femur and the pelvis, the supporting function of the hip is poor; Trendelenburg's phenomenon is positive. The patients are troubled with a very pronounced limp,

resulting from the shortening of the leg as the failing fixation in the hip. The power of endurance is greatly reduced for standing position as well as walking. On the other hand, owing to the preserved capacity for flexion in the hip the patients have no trouble in sitting.

Roentgenographically the extraarticular pseudarthrosis presents a complete absorption of the head and neck of the femur. The acetabular destruction is variable in extent. The shaft of the femur is displaced upwards so that the medial surface of the greater trochanter is in contact with the lateral surface of the ilium. Around the site of contact the ilium sometimes presents deposits of bone in the form of a false acetabulum. The shaft of the femur is narrow and atrophic; often the greater trochanter is studded with spots resembling focal rarification of the bone. The lesser trochanter may be deformed or absorbed. The pelvis often shows marked deformity.

Case 1.

Male, born 1931. Reg. No. 171/36. Admitted to the Kristianstad Hospital 1932 for tuberculous coxitis, on the left side.

Roentnography, 7/5-32: Luxation of the left hip, swelling of the soft parts, no destruction of bone.

After reposition, destructive processes developed in the head of the femur and acetabulum. The head and neck were absorbed rapidly.

Roentgenography 30/11-32: Absence of the head and neck of the femur; destruction of the acetabulum; extraarticular pseudarthrosis developed.

In September 1935 the patient was admitted to Kronprinsessan Victoria's Kustsanatorium (Crownprincess Victoria's Seashore Sanatorium here abbreviated as K.V.K.). At that time there was a marked limp in the left hip. The greater trochanter was displaced upwards; the hip was mobile; there was a small abscess in the gluteal fold.

Two attempts were made at bloodless "reposition" with the greater trochanter placed in the acetabulum; this resulted in increased destruction of the acetabulum, fistula formation and

such a marked injury to the supporting function of the hip, that the leg was no longer able to carry any weight, not even in plaster cast. On this account, operative treatment was regarded as indicated.

8/10-36: Resection of the hip (Og-Jn.). Caseous material and osseous foci were found in the acetabulum, purulent and granulating foci in the greater trochanter. Evacuation of the foci, chiselling of the roof of the acetabulum. Transverse osteotomy through the greater trochanter. The upper end of the shaft of the femur is placed medially in the roof of the acetabulum, in abduction and slight flexion. Suturing; bilateral hip plaster.

Roentgenography, 28/10-36: Femur in good position.

Roentgenography, 23/8-37: Acetabulum sharply defined. Upper end of the femur coarse, broad, irregular, resting against the lateral upper part of the chiselled acetabulum. No osseous connection. (Fig. 1.)

The patient was discharged from the hospital on 12/10-37 with hip bandage. He was able to walk with a moderate limp, and he was symptom-free subjectively. Femur in flexion 30° , abduction 10° , middle rotation. Mobility: Flexion additional 20° . Functional shortening: 2 cm.

Case 2.

Male, born 1929. Reg. No. 2/36. Admitted to K.V.K. in October 1930 for coxitis, on the left side.

Roentgenography, 10/11-30: Bilateral focus of the head of the femur; luxation of the left hip; deposits on the trochanter and the shaft of the femur.

Roentgenography, 14/11-30: Hips in maximal abduction both pointing towards the acetabulum. Protracted fixation in abduction.

Roentgenography, 23/2-32: Left hip: Head of the femur absent; cranial and medial destruction of the acetabulum.

In spring 1936 the patient was transferred to the Vanförestaltens Skolhem (school for crippled children), Hälsingborg. At his discharge he was wearing a hip casing, and he was able

to walk rather steadily but with a considerable limp. The left hip was flexed and outward rotated, with a real shortening of 3 cm. Mobility for flexion.

In February 1938 the patient was readmitted to K.V.K. for



Fig. 1.

hip trouble and an abscess of the thigh. All symptoms subsided after puncture of the abscess and under treatment with extension. As the hip was markedly insufficient, however, operative treatment seemed indicated.

1/7-38: Resection of the hip (Og.-Jn.). Resection (with chisel) of the pseudarthrotic surfaces, and extirpation of infected soft parts. Chiselling of the roof of the acetabulum, resection of the lesser trochanter with the insertion of the psoas tendon, osteotomy through the greater trochanter. The upper end of

the shaft of the femur was placed medially in the roof of the acetabulum in abduction and slight flexion. Suturing; double hip plaster.

Post-operative course without any complications from the hip.

Roentgenography, 10/1-39: Femur in abduction 5° , and flex-



Fig. 2.

ion. Broad contact between the shaft of the femur and the medial part of the acetabulum; surfaces of contact sclerotic. Greater trochanter displaced laterally; large deposits of bone at its base (Fig. 2).

10/1-39: Hip fixed in flexion 40° , abduction 5° , middle rotation. Under anæsthesia the flexion could be corrected to 20° . Functional shortening after this: 2 cm. Lateral vacillation in the knee-joint. The patient is able to walk about in hip plaster without the support of a cane, limping moderately.

Case 3.

Male, born 1922. Reg. No. 150/36. At the age of 3 years, coxitis, on the right side; under treatment in the Apelviken Seashore Sanatorium in 1926—30 and 1932—33.

Roentgenography, 25/9-26: Extensive destruction of the acetabulum, without demarkation. Defect with blurred borders in the medial part of the capital epiphysis and in the medial corner of the neck of the femur.

Roentgenography, 4/6-28: Extensive, well-defined destruction of the acetabulum in the ilium and ischium. Head and neck of the femur absent; the upper end of the femur rests against the lateral edge of the false acetabulum.

Roentgenography, 12/11-32: Destruction of the acetabulum well limited. The apex of the greater trochanter rests against the lateral part of the acetabular roof; femur in outward rotation: lesser trochanter immediately above the Y-cartilage.

Admitted to K.V.K. in June 1935 with fistulas and abscesses around the hip-joint. Femur in outward rotation and adduction. Considerable mobility in the hip. Muscular atrophy of the entire right lower extremity.

Roentgenography, 7/10-35: Extensive destruction of the acetabulum with perforation into the pelvis. Lesser trochanter at the level of the centre of the acetabulum; greater trochanter moved upwards, above the lateral margin of the acetabular roof.

29/1-36: Resection of the hip (Og.-Jn.). Pus and granulation tissue in the pseudarthrosis. Perforation of the acetabulum, with pelvic abscess formation. Resection of the pseudarthrotic surfaces; revision of fistulas; extirpation of abnormal soft tissues. Chiselling of the acetabular roof; osteotomy through the greater trochanter; resection of the lesser trochanter. The shaft of the femur is placed up against the medial part of the acetabular roof, in abduction and slight flexion. Sutures; double hip plaster.

Roentgenography, 25/9-36: Shaft of femur in broad contact medially with the acetabular roof. Greater trochanter displaced laterally. The interval between the femur and the acetabulum

is occupied by a generally vigorous pattern of spongiosa; calcium content good (Fig. 3).

27/4-37: Femur ankylosed in flexion 20° , abduction 5° , and outward rotation about 20° . Functional shortening: 6.5 cm. The patient is able to walk about with hip bandage and extension



Fig. 3.

bandage, without the support of a cane; limping very slightly. Since autumn 1938 he has been attending school at the Institution for the Crippled, Stockholm.

Case 4.

Male, born 1918. Reg. No. 107/36. Onset of limping of right leg in June 1924. Admitted to the Orthopedic Clinic, Lund, in March 1925.

Roentgenography, 21/3-25: Destructions in the roof of the right acetabulum and in the lateral part of the head and neck of the femur; head otherwise preserved. Cartilaginous slit lowered but very little.

Roentgenography, 8/9-28: Irregular remnant of the head and neck of the femur inserted centrally in considerably enlarged, well-defined, false articular socket.

Admitted to K.V.K. in March 1935, with right hip in flexion and adduction, considerable mobility in the hip, and a function-



Fig. 4.

al shortening of 9 cm. Numerous abscesses and fistulas around the right hip.

Roentgenography, 27/3-35: Extensive destruction of the acetabulum; head, neck and lesser trochanter absent; greater trochanter pushed up against the ilium. (Fig. 4).

After protracted extension treatment, an unsuccessful try was made to carry weight on the extremity in plaster cast.

13/11-36: Resection of the hip (Og.-Jn.). Granulations, caseous material and pus in and around the pseudarthrosis. Pelvic perforation with retroperitoneal abscess. Resection of the pseudarthrotic surfaces and of the infected soft parts; revision

of fistulas. Chiselling of the acetabular roof; osteotomy through the greater trochanter. The shaft of the femur was placed medially in the roof of the socket in abduction and flexion, in which position it was kept with some difficulty. Suturing; double hip plaster.

9/10-37: Healed. Wearing hip capsule and extension bandage,



Fig. 5.

the patient is able to walk about steadily, limping but very little.

10/8-38: Right hip ankylosed in flexion 15° , abduction 10° , inward rotation 10° . Functional shortening: 7 cm. Trendelenburg negative. Walking about without a cane, limping but little.

Roentgenography, 12/8-38: Shaft of the femur resting against the lateral part of the socket; broad contact; considerable sclerosis; lateral displacement of the trochanter. (Fig. 5).

He is now being trained in joinery in Vanförestalten, Häl-singborg.

Case 5.

Female, born 1911. Reg. No. 90/36. Since the age of 5 years, under treatment for coxitis, on the right side. Admitted to K.V.K. the first time in 1927.

Roentgenography, 24/8-27: Extensive destruction of the acetabulum. Head and neck of the femur absorbed. Apex of the lesser trochanter at the same level as the roof of the false socket.

Readmitted to K.V.K. in May 1934, right hip in flexion and adduction, and a real shortening of 7 cm. Abscesses and fistulas around the hip. Gradually, development of albuminuria, functional disturbances of the liver, and marked impairment of the general condition.

After protracted extension treatment, an unsuccessful try was made to put weight on the leg in plaster bandage.

Roentgenography, 7/7-36: Head and neck of the femur absent; extensive destruction of the acetabulum. Femur displaced upwards, against the ilium; lesser trochanter absent.

27/8-37: As the patient now has been confined to bed for three years, and as the hip cannot carry any weight, operative treatment is regarded as indicated, aiming at a more adequate drainage of the hip and better fixation between the femur and the pelvis.

Resection of the hip (Og.-Jn.). Granulations, caseous material and pus in and around the pseudarthrosis; focal processes in the greater trochanter. Resection of the pseudarthrotic surfaces; chiselling of the roof of the socket; osteotomy through the greater trochanter; chiselling of the insertion of the psoas tendon at the site of the smaller trochanter. Owing to the rather exhausted condition of the patient, the abnormal soft tissues could not be extirpated so completely and the fistulas not repaired so radically as would have been desirable. The shaft of the femur was placed medially in the roof of the socket in abduction and flexion. Sutures; double hip plaster.

Roentgenography, 27/6-38: Broad contact between the shaft of the femur and the medial part of the socket. Sclerosis in the surfaces of contact, no bony junction.

The general condition of the patient improved gradually.

5/1-39: General condition fairly good; liver not palpable; albumin in the urine: 0.1 ‰. Hip akylosed in flexion 20°, abduction 10°, outward rotation 20°. Functional shortening: 3 cm. Most of the fistulas still open, with extremely slight secretion. The patient is up, walking about wearing hip bandage, and having the heel of the shoe elevated, limping but little.

Roentgenography, 5/1-39: Shaft of the femur resting against the medial part of the roof of the socket; broad contact between sclerotic surfaces. Greater trochanter displaced laterally.

Case 6.

Male, born 1914. Reg. No. 200/36. Since 1916, treatment for coxitis, on the right side, in several hospitals.

Admitted to K. V. K. in October 1935, with the right hip in flexion and adduction, considerable mobility. Trendelenburg positive. Numerous fistulas around the hip.

Roentgenography, 25/10-35: Extensive destruction of the acetabulum, probably perforation into the pelvis. Maximal upward displacement of the shaft of the femur; head and neck absent. Greater trochanter resting against the lateral surface of the ilium; lesser trochanter absent.

November 1936: General condition improved; two fistulas persist. The patient is up and walks about without hip bandage, limping considerably. Operative treatment with resection is suggested but the patient refuses to submit to it, as he thinks that after the operation he might have trouble in sitting.

At the discharge, in June 1936, one fistula remained. No change in the hip. Functional shortening: 7 cm. Extension bandage.

Case 7.

Male, born 1896. Reg. No. 153/38. Since the age of 3 years, coxitis on the right side; operated for abscesses on the thigh.

Admitted to K. V. K. in July 1938, for an abscess of the thigh. At that time the patient was walking about with an ex-

tension bandage, working as caretaker and fireman. Right hip kept in flexion and adduction. Upward displacement of the trochanter: 7 cm. Functional shortening: 10 cm. Considerable mobility. Trendelenburg positive. Incision of the abscess.

Resection of the hip is discussed, but the patient refuses.

Roentgenography, 3/8-38: Head and neck of the femur absent. No distinct destruction of the socket. Greater trochanter moved upwards against the ilium; well-defined areas of rarefaction within the trochanter. Compression of the right half of the pelvis.

At the discharge: No change in the condition of the hip; practically no evidence of the abscess.

Case 8.

Female, born 1904. Reg. No. 291/37. Since the age of 3 years, affection of the left hip, giving rise to limping. The patient was working as a housemaid until 1937. In autumn 1936 she had pain in the left hip; in 1937 an abscess appeared.

Admitted to K. V. K. in October 1937. Left hip kept in flexion and adduction, with a functional shortening of 4 cm. Trendelenburg positive on the left side, negative on the right. Both hips freely movable (abduction 30°). Incision of abscess on the left thigh.

Roentgenography, 22/10-37: The left hip shows extensive irregular destruction of the acetabulum; the head and neck of the femur are absent; the shaft of the femur is moved upwards, with the greater trochanter resting against a false socket, laterally on the ilium. Right hip subluxated; cartilaginous fissure lowered; surfaces of contact sclerotic. Bony deposits laterally, above the socket. (Fig. 6).

On account of the changes in the right hip, an operative ankylosis of the left hip seems contraindicated. The patient is discharged, with a fabric corset made especially for her.

In all the cases above the tuberculous process has shown signs of activity in the form of abscesses or fistulas. In the operations performed, granulations, caseous material and pus

were found and evacuated. The destruction of the acetabulum has varied in extent; the floor of the socket was perforated in Cases 3 and 4, and a retroperitoneal pelvic abscess has been evacuated. In several cases the greater trochanter has been crowded with tuberculous foci.



Fig. 6.

All the patients have shown symptoms of insufficient fixation between the femur and the pelvis. Trendelenburg's phenomenon has been positive, more or less markedly. The mobility in the hip has been considerable. The shortening of the extremity due to the upward displacement of the femur has been accentuated further by the usual faulty position of the femur in adduction and flexion. Owing to this shortening as well as to the failing fixation between the femur and the pelvis, all the

patients have been limping considerably. When the pseudarthrosis has been stiff (Cases 7 and 8) the supporting function of the hip has been so good that the patients have been able for considerable lengths of time to do some rather exerting manual work. When the pseudarthrosis has been lax, the hip has not been able to carry any weight, not even in plaster bandage (Cases 1, 4 and 5). Periods of good health and relatively good function of the hip have alternated with periods of pain, abscess formation and fistulation. The considerable mobility in the hip has made it possible for the patient to sit comfortably on an ordinary chair. As far as that goes, the lack of fixation in the pseudarthrosis and the weakness of the muscles keep the patients from making any particular use of this mobility. In Case 8 the "sound" hip was subluxated and presented a marked degree of arthritis deformans.

From the above it is evident that the disablement in extra-articular pseudarthrosis above all is dependent upon the impairment of the supporting function of the hip. The operative measures adopted in these cases have aimed at an improvement of the supporting function in Cases 1, 2, 3, 4 and 5. The operation has aimed to produce a firm and solid connection between the femur and the pelvis with the extremity fixed in a suitable position.

The pseudarthrosis have been laid open with Smith-Petersen's incision; the pseudarthritic surfaces and the surrounding soft parts with tuberculous infiltration are resected; when fistulas have been present, they are revised. The roof of the socket is chiseled out so as to form a horizontal surface for support. By transverse osteotomy the greater trochanter is separated from the shaft of the femur, and together with its attachment of muscles it is displaced laterally. The shaft of the femur is pulled down, and its upper end is fixed tightly against the medial part of the acetabular roof.

In Cases 2, 3 and 5, where the lesser trochanter with the attachment of the psoas tendon is chiselled off and displaced medially, the shaft of the femur has kept its original contact medially in the acetabular roof.

In Cases 3 and 4 the operation has resulted in bony ankylosis in a good position, with good function. In Cases 2 and 5 the femur and the ilium have become united in a good position through a firm fibrous ankylosis; and the supporting function is good. In Case 1 the upper end of the femur rests against the upper lateral part of the chiselled socket; the thigh is held in flexion and abduction with 20 degrees' flexion mobility. In this case the supporting function has been improved essentially through the operation; in the other operated cases the supporting function is now very good. In Cases 1, 3 and 4 all the fistulas have healed after the operation; in Case 5 the fistular secretion has diminished most considerably, and the general condition of the patient that was greatly impaired before the operation has improved essentially.

In Case 6, with poor supporting function and several fistulas, the patient refused to be operated. In Case 7 the patient found his working capacity so good that he would not submit to an operation. In Case 8 the other hip was subluxated and impaired by arthritis deformans. With a view to the poor prognosis of this affection, an anylosis of the pseudarthrosis had to be looked upon as contraindicated. In the opinion of the author, full indication for operative treatment has been present in Cases 1—6, relative indication in Case 7. In tight pseudarthrosis the function may be so good that operative treatment would be superfluous—something that has been pointed out by Sorrel.

SUMMARY

Sorrel's "pseudarthrose extraarticulaire" is characterized by complete absorption of the head and neck of the femur and upward displacement of the femur, so that the greater trochanter articulates against the ilium. The disablement is due above all to impairment of the supporting function of the hip-joint, in some degree also to relapsing abscesses and persistent fistulas. Owing to the remaining mobility in the hip the patients are able to sit without any trouble; but apart from this, the mobility cannot be utilized.

The author gives an account of six cases with very marked insufficiency of the hip, and two cases with fairly good supporting function. The operation has aimed to remove tuberculous tissue in order to improve drainage and thus promote the healing of the process, besides to produce a firm union between the femur and the ilium capable of weight-carrying.

The hip is laid open by means of Smith-Petersen's incision; the morbid parts of the bones and soft tissues are removed; and fistulas are repaired thoroughly. The roof of the joint socket is chiselled up in the form of a horizontal supporting surface. By transverse osteomy the upper part of the greater trochanter is separated from the shaft of the femur and displaced laterally; in three cases the insertion of the psoas tendon on the lesser trochanter was chiselled off too. The upper end of the shaft of the femur is fixed medially against the roof of the socket in slight abduction and flexion. The operation wound is sutured primarily, and the patient is fixed in a large double hip plaster cast with the femur in about 20° flexion, $5-10^{\circ}$ abduction and middle rotation or, at the most, 15° outward rotation.

In two cases the operative treatment has resulted in osseous ankylosis, in two cases in a firm fibrous ankylosis, all in a good position and with good supporting function. In the fifth case where the insertion of the psoas tendon was not chiselled loose, the femur has shifted to the lateral part of the socket. The supporting function is now far better than before the operation, but the possibility of a secondary faulty position cannot be excluded yet, as there is still a considerably mobility. The fistulas present before the operation have healed or improved.

Two patients have refused an operation as suggested; in one case the ankylosing operative measure was contraindicated, as the other hip was subluxated and attacked by arthritis deformans.