

REDUCTION AND THE SHELF OPERATION IN OVER-AGE DISLOCATIONS

By

GUNNAR WIBERG

The time at which the reduction of a congenital dislocation takes place is of great importance for the end result, as is well known. The earlier an operative procedure can be realised the better becomes the functional and roentgen-anatomical result which one may expect. The advocate of this early reduction was Putti, who by means of a well-planned organisation obtained many dislocations for treatment during the early infancy of the children.

The cause of the deterioration in results amongst older children is the shrinking of the soft tissue around the joint which makes the reduction of a dislocated hip more difficult after each successive year, since the older the individual grows the more pronounced becomes the shrinking. The reduction itself increases the traumatic effect and the pressure to which the head is subjected after being reduced into the acetabulum may often bring about the well-known complication, caput necrosis, and result in stiffness of the joint. Reductions up to the top age limit stated by Lorenz, 7 years, occur very rarely in Scandinavian countries and even at the age of 4-5 years the reduction procedure is already looked upon with doubt.

Having regard to these less successful results, every reduction which is not perhaps absolutely necessary has been avoided in most cases. If the surgeon refrains from an immediate reduction and instead employs the considerably gentler method by which the head is centralised in the acetabulum as the result of slow traction, the final reduction and plaster immobilisation can take place with the use of relatively slight force. For reasons which I shall at once put forward, however, I consider that this procedure ought to be combined with a shelf operation.

In an earlier paper about shelf operations I touched upon the

growth of the shelf edge in those cases of dislocation which had been reduced at the customary age of 1-2 and it appears as if the principal growth, if it comes, already occurs before the age of 4-5. After this period the tendency for the shelf to develop diminishes and it was considered that cases in which such a growth had not arisen ought to be suitable subjects for a shelf operation.

It also seems improbable to me that any appreciable growth of the shelf may be expected in cases of un-treated dislocations in 4-5 year olds; from this point of view it is certainly best if a shelf operation is also carried out, in cases where a reduction has been performed at this late age. By this I do not refer to the most usual type of shelf operation, comprising solely the chiselling-down of a cortex slice supported by bone grafts and intended to produce a lateral enlargement of the acetabulum, but a considerably more extensive breaking down of the acetabular roof. The procedure is in no way new but was announced by Gill as early as 1928 when he reported an operation on the type of case which he assigns to his group II, and of approximately the same kind as that which I shall describe later. The reason why I should like to report a couple of operated cases here is principally that the operation described by Gill seems to me to be no longer in use in Scandinavian countries and since it appears to be valuable in these special cases, some account of it may be justified.

S. N. born 6/10 1942.

Walked late and limped the last two years.

Condition on entry 30/9 1947: Pronounced limp on left side. Positive Trendelenburg sign on left side. Left leg shortened $1\frac{1}{2}$ cm. Femoral head was palpated and

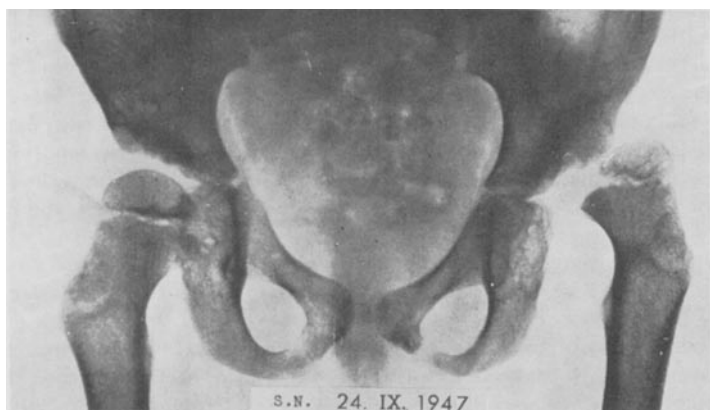


Fig. 1.

found to be upward and laterally displaced. Mobility of the hip joints was normal.

Roentgen picture 24/9 (fig. 1) showed a dislocation of the caput femoris on the left side. On right side a dysplastic acetabulum was found.

On day of entry plaster traction was applied and pull was exerted in abduction with a weight of 5 kgs.

Roentgen check 14/10 showed no change in position. In order to produce an increased effect lateral traction was applied to the upper part of the thigh and



Fig. 2.

pull was exerted medially; the weight was 2 kg. and a new roentgen check 5/11 (fig. 2) now revealed that the head had approached a normal position in relation to the acetabulum. From the lateral picture, however, it was established that the head of the femur was displaced far forwards.

Operation on the 6/11 (W-g). Open reduction and shelf operation. Ether narcosis.

The patient was placed in position on the traction table in moderate extension.

The Smith-Petersen incision was used, and the origin of the tensor fascia lata together with the foremost parts of the gluteus medius and minimus were detached. The femoral head was placed so far forward that the vertex of the acetabulum was almost situated immediately behind the anterior inferior iliac spine. The joint capsule was incised on its lateral aspect and it was then established that the head was slightly ovoid in form. On palpation of the acetabulum it was found to be partly filled with soft tissue, but the head of the femur could be replaced into the acetabulum by means of abduction after which the hip was firmly fixed in this position.

A thin slice of cortex 1 cm. wide and 4 cms. long was chiselled down from the outer aspect of the ala ossis ilii immediately above the acetabular border. Afterwards the cortex defect was chiselled into to a depth of 3 cms. and fully 3 cms. from front to back; the direction was such that the chisel followed as far as possible a line parallel to the contour of the acetabular roof. The part of the acetabular roof which was loosened in this fashion was carefully broken down and the space was filled by bone grafts taken from the iliac crest. The

capsule was closed with catgut sutures, after which the musculature was sutured in its original position and the wound was closed.

A double leg-trunk plaster cast was applied to the patient, and the leg was maintained in about 40° abduction.

Roentgen-check 8/11 showed that the caput epiphysis was centrally positioned in the acetabulum. A further check 16/12 (fig. 3) showed no change in position and the plaster was split, after which mobilisation of the joint was commenced.

On the 27/1 1948, the patient was allowed to begin walking about, but not to put weight on the right leg.

Early in February the patient was permitted to begin standing on the leg and

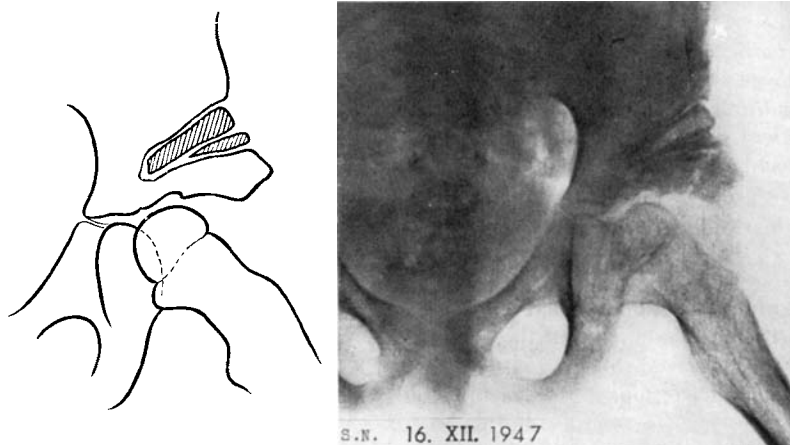


Fig. 3.

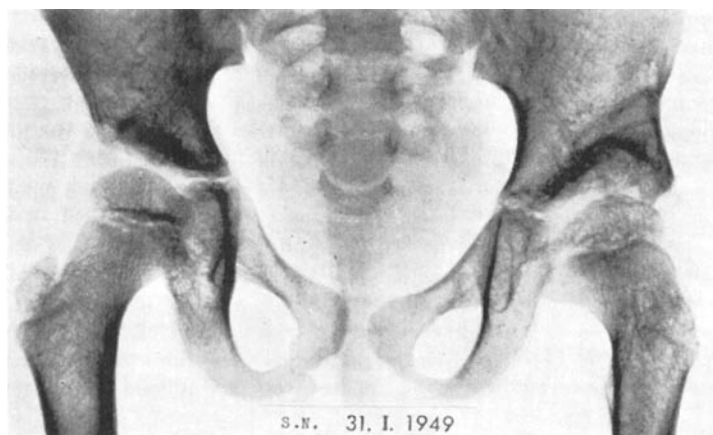


Fig. 4.

on the 20th she walked without any support even though her gait was relatively bad.

On the 3/3 she walked considerably better and exhibited 95° flexion, a total of 70° ab- and adduction and, in all, 20° rotation.

At the last examination on the 31/1 1949 (fig. 4), the patient walked without any subjective trouble, was able to run as fast as her friends and played about without inconvenience. No shortening of the limb was discovered at the examination, and no limp, and the Trendelenburg sign was negative on both sides. The mobility of the left hip was almost equal to that of the right, and only a flexion and adduction limitation of 10° existed compared with the right side. A slight atrophy of the thigh of about 1 cm. in extent revealed itself but, against this, there was no atrophy of the calf.

G. M. born 25/2 1944.

Limped ever since she started to walk at one year.

Condition on entry 15/4 1948: 2 cm. shortening of leg on left side. Head of femur was palpated and found to be displaced laterally and upward. Trendelenburg sign was positive on left side. Free mobility.

Roentgen 15/4 (fig. 5): A dislocation of left femoral head, high up. The acetabulum exhibited considerable dysplasia.

17/4: Plaster traction was applied with weights of 2 kgs. increased to 5 kgs. on the 20/4.

Roentgen 23/4 showed that the head had been pulled somewhat downward towards the acetabulum. A further check 27/4 produced an unchanged picture and on the 3/5 the condition was still the same.

After the direction of the traction pull was altered with increasing abduction, its effect seemed to improve and on the 25/5 (fig. 6), the head of the femur was in a rather good position in relation to the acetabulum.

On the 28/5 open reduction and shelf operation were performed (W-g): Ether narcosis.

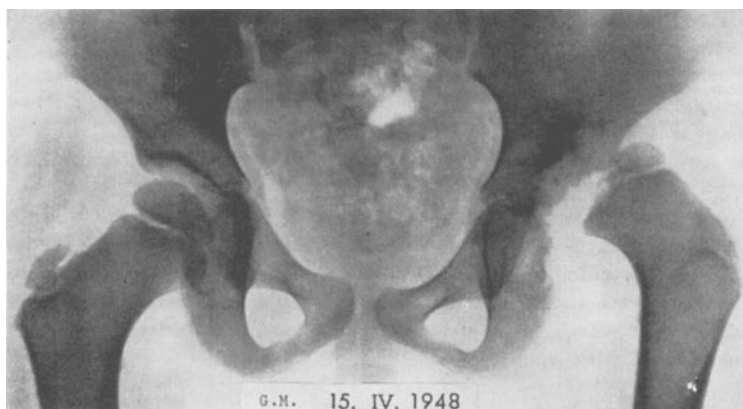
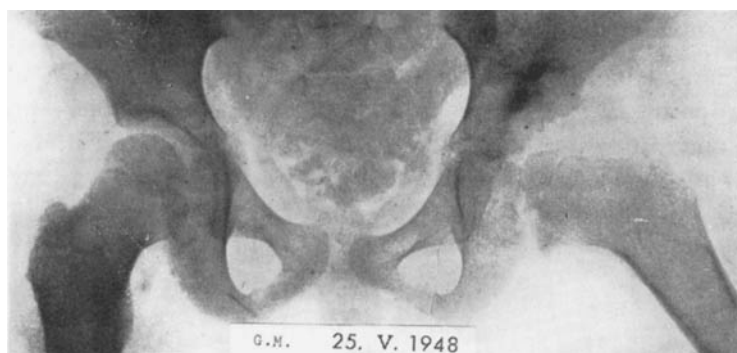
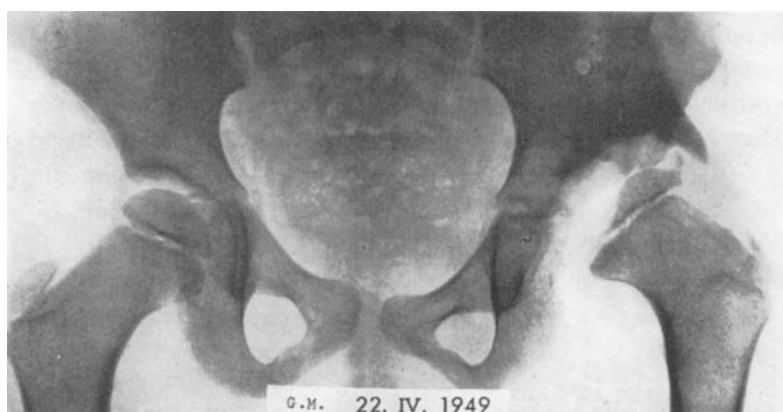
The patient was placed in position on the traction table, moderate traction being maintained.

The joint was exposed by means of a Smith-Petersen incision and the usual subperiosteal detachment of the foremost parts of the gluteus medius and minimus as well as of the origin of the tensor fascia lata was performed. The transverse head of the rectus femoris was excised and the joint capsule was divided longitudinally to the extent of 2 cms, so that the head and the upper part of the acetabulum could be inspected. At this stage of the operation the extension was increased after which the leg was abducted and the head took up a central position in the acetabulum. Following this the operation proceeded in other respects in the same way as that described in the first case.

After the operation a double leg-trunk plaster was applied to the patient and the right leg was placed in strong abduction.

Roentgen-check on the 10/6 revealed slight subluxation of the head. Since the roentgen-check of the 14/7 also revealed a tendency for the head to slip upwards, a plaster traction was applied while the leg was maintained in plaster in abduction.

20/8: Traction apparatus was removed. The patient retained the plaster after it had been split and mobilisation was commenced.

*Fig. 5.**Fig. 6.**Fig. 7.*

1/9: Patient began to get up and about, but did not put weight on the leg; the mobility of the joint was satisfactory.

15/9: Patient began to put her weight on the leg while one week later she was already walking without support. With the exception of the rotatory movements the mobility was almost equal to that of the left side.

At the last examination 22/4 1949 (fig. 7): The parents stated that the girl appeared symptom-free in the hip joint. She could run and play about the whole day with possibly only a slight feeling of tiredness in the evening. At the examination the patient walked well although her hip jerked slightly perhaps. Her left leg exhibited a shortening of 1 cm, and 8 cms above the patella an atrophy of the thigh was present, 1½ cms in extent. The Trendelenburg sign was slightly positive on the left side, negative on the right. On this occasion mobility of the hip joints was normal and exactly equal.

S U M M A R Y

Over-age cases of congenital dislocation of the hip, by which is meant cases which do not come for treatment in the first 2 years of life, may be treated by slow reduction by traction applied for several weeks. When, in this way, the head has been reduced to a central position in the acetabulum, a final open reduction, supplemented by a shelf operation, can be performed if necessary. The shelf is made as originally recommended by Gill, by completely breaking down the whole roof of the acetabulum. 2 cases, aged 4 and 5 years respectively, were reported.

R E S U M E

Les cas « anciens » de dislocation congénitale de la hanche, c'est-à-dire qui n'ont pas été l'objet d'un traitement durant les deux premières années de vie, peuvent être traités par réduction lente au moyen de la traction appliquée durant plusieurs semaines.

Quand on est arrivé par ce moyen à replacer la tête du fémur au centre de la capsule articulaire, on peut procéder à une réduction finale ouverte, à laquelle on peut suppléer si nécessaire par l'opération de la butée ostéo-plastique. Celle-ci est pratiquée, comme le recommande *Gill*, en brisant complètement tout le toit de la capsule articulaire.

. 2 cas, âgés de 4 et 5 ans respectivement, sont rapportés.

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

Alte Fälle von angeborener Hüftverrenkung — darunter werden Fälle verstanden, die nach der Vollendung des 2. Lebensjahres zur Behandlung kommen — können mit langsamer Reduktion mit Hilfe

einer mehrere Wochen verwendeten Extension behandelt werden. Wenn in dieser Weise der Kopf in eine zentrale Stellung in das Acetabulum gebracht worden ist, kann man eine offene Reduktion mit einer Pfannendachplastik, wenn nötig, hinzufügen. Das Dach wird, wie ursprünglich von Gill anbefohlen, derartig gemacht, dass man die ganze Decke des Acetabulums hinunterbricht. 2 Fälle im Alter von 4 und 5 Jahren werden berichtet.

REFERENCES

- Gill, A. Bruce:* Plastic Construction of an Acetabulum in Congenital Dislocation of the Hip—the Shelf Operation, *J. Bone and Joint Surg.* 1935, 17, 48-59.