

MODIFIED SHELF OPERATION WITH LOWERING OF THE ENTIRE ROOF OF THE ACETABULUM FOR CONGENITAL DISLOCATION OF THE HIP

Review of a Surgical Series

By

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In the event of unsatisfactory open or closed reduction of a congenitally dislocated hip further therapy must be performed. This is also applicable to untreated primary partial dislocations, which are coming to treatment later in life (*Gill 1935, Wiberg 1953*). It is well known, that these defective hips have a bad prognosis if they are left untreated (*Wiberg 1939, Severin 1941*). Of the surgical methods available for this purpose (*Wiberg 1944*), shelf operation now occupies a prominent position. The main surgical procedures were first described by *Albee* and by *Spitzzy*, from which several modifications have since evolved.

In a comprehensive paper *Jacobsson* (1954) described the results of shelf operation for congenital dysplasia and for partial and complete dislocation of the hip. In most of the cases in his series the shelf operation had been performed by chiselling off a flap of bone from the ilium to provide a support for the femoral head. In some cases the acetabular edge was also brought down, but only in one case was the entire roof of the acetabulum lowered, so that, as pointed out by *Jacobsson* himself, no valid conclusions could be made about the value of the last-mentioned technique. He did, however, stress the difficulty and the risks of the procedure. He also stated that no series operated upon by that method had been published.

We therefore considered it worth while to review the patients who had been operated upon by this procedure at the Department from 1947 to 1955.

Procedure: In cases with complete dislocations, before operation, a plaster traction is applied with a weight of about 5 kgs for 5–6 weeks.

The anaesthetised patient is placed in position on the traction table in moderate extension. Smith-Petersen incision is used and the origin of the tensor fascia lata together with the foremost parts of the gluteus medius and minimus is detached. If open reduction is not necessary, the capsule is not opened. A thin slice of cortex is chiselled down from the outer aspect of the ala ossis ilei immediately above the acetabular border. The entire roof of the acetabulum is reflected downward by driving an osteotome deep into the ilium horizontally just above the roof and prying down the roof. Bone wedges from the crest of the ilium are driven deep into this open space to maintain the roof and the bone shelf securely in position. After the operation the patient is placed in bed with traction of the operated leg for 6–8 weeks (*Wiberg*).

Material: The material consisted of 15 patients (14 females, 1 male), of whom 12 had been submitted to operation on the left side; 2, on the right, and 1, on both sides. The patients' age at the time of operation ranged between 2.5 and 11.3 years (average 6.9 years). The interval between the operation and the review varied between 2.6 and 10 years (average 6.3 years). In ten of the 16 hips closed reduction was tried earlier but because of relapse in the shape of partial dislocation (9 cases) or pronounced acetabular dysplasia (1 case) they were submitted to modified shelf operation. In 6 cases (4 partial dislocations and 2 complete dislocations) the modified shelf operation was done primarily and in the 2 complete dislocations the operation was performed in association with open reduction. In no instance did any primary complications occur.

All of the 15 patients could be traced for the review. They were then 6.5 to 18 years old (average 13.1 years). The review included both clinical and roentgenologic examination.

Symptoms: All of the patients reported that they had felt better since the operation. One complained of slight aching pain on change of weather and one that the hip ached if she stood for a long time at a stretch. Two others reported that they had slight pain if they walked for 2–3 kilometres. The remaining 11 said that the hip never gave them any trouble. Of these, 7 were active members of sport or gymnastic clubs.

Signs: As compared with the state of the hip before the operation, the range of movement was better in 5, unchanged in 7 and somewhat more limited in 4. Before the operation 10 patients had a limp, but at the time of the review the defect had disappeared in 3. In none had any limping appeared for the first time after the operation. As to Trendelenburg's sign, it was positive for 8 hips before operation as against 2 of them at

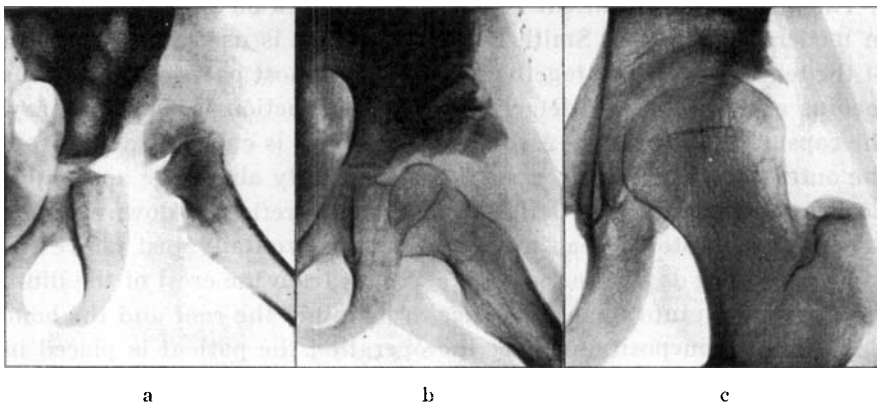


Fig. 1.

Example of lowering of entire acetabular roof.
 a) before operation. b) 2 days after operation.
 c) at review (9.7 years after operation).

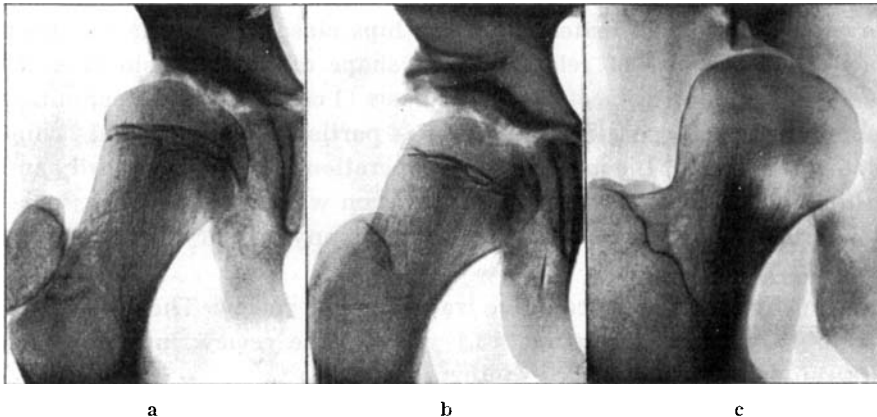


Fig. 2.

Example of lowering of only the lateral edge of acetabulum.
 a) before operation. b) 2 days after operation.
 c) at review (5.5 years after operation).

the review. Of the remaining 8 hips for which the sign was negative before operation, it was positive in 4 at the review. Thus, in 6 hips the results of the test were the same before operation as afterwards.

Roentgenographic findings: On examination of the roentgenograms taken at the review interest was focused mainly on the results of the lowering of the acetabular roof, a careful search also being made for any complications in the form of necrosis or resorption.

Jacobsson stressed the difficulty in lowering the entire acetabulum by methods hitherto available and expressed the view that in most cases only a lowering of the lateral edge of the acetabulum will be secured or only a compression of the spongy bone above the acetabulum. We are fully aware of the difficulty in deciding from the roentgenogram whether any lowering really has been achieved, but we nevertheless believe that the entire acetabular roof had been lowered in 11 of our cases (Fig. 1), the acetabular edge only in 3 (Fig. 2) and that no lowering had been secured in 2. Reexamination of the roentgenograms taken during and soon after the operation showed that the entire acetabular roof had never been lowered in the 5 last-mentioned cases.

In none of the cases did the grafted bone show any signs of resorption. Necrosis of the joint cartilage was seen in 1, and osteochondritis in 1. These complications had occurred after the operation and have resulted in a slight deformation of the femoral head. However, as yet, the functional state of the hip is still better than before the operation.

SUMMARY

A series of 16 dysplastic hips (13 partly and 2 completely dislocated) on which modified shelf operation had been performed with attempted lowering of the entire acetabular roof were reviewed 2.6 to 10 years (average 6.3 years) after the operation. All of the patients reported that they had felt better since the operation. Roentgenographic examination revealed that the entire acetabulum had been lowered in 11, the lateral edge only in 3, and that no lowering at all had been obtained in 2. Late complications had occurred in 2 (necrosis of the cartilage in one and osteochondritis in the other).

RESUME

Une série de hanches dysplastiques (13 avec dislocation partielle, 2 complète) sur lesquelles a été pratiquée l'opération console modifiée pour tenter d'obtenir un abaissement de toute la partie supérieure de la cavité cotyloïde ont été réexaminées entre 2,6 et 10 ans (en moyenne 6,3 ans) après l'opération. Tous les malades ont déclaré qu'ils allaient mieux depuis l'opération. L'examen radiographique a révélé que la cavité cotyloïde toute entière avait été abaissée dans 11 cas, seulement sur le bord latéral dans 3 et qu'aucun abaissement n'avait été obtenu dans 2 cas. Des complications tardives sont apparues dans 2 cas (nécrose du cartilage dans l'un et ostéochondrite dans l'autre).

ZUSAMMENFASSUNG

Eine Reihe von 16 dysplastischen Hüften (13 teilweise und 2 vollständig verrenkten), an denen eine veränderte Pfannendachplastik ausgeführt worden war und der Versuch unternommen wurde das ganze Pfannendach zu senken, wurden 2,6 bis 10 Jahre (Durchschnitt 6,3) nach der Operation untersucht. Alle Patienten erklärten, dass sie sich seit der Operation besser fühlten. Röntgenuntersuchungen zeigten, dass das ganze Pfannendach in 11 Fällen gesenkt worden war, der laterale Rand allein in 3 Fällen und dass keinerlei Senkung in 2 Fällen stattgefunden hatte. Späte Komplikationen waren in 2 Fällen aufgetreten (Knorpelnekrose in einem und Osteochondritis in dem anderen).

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