A new surgical approach in 8 cases of polygonal triple pelvic osteotomy

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We have undertaken 12 polygonal osteotomies, using an improved approach in 8. The operation was successful in correction of acetabular dysplasia after ossification of the triradiate cartilage. It was also useful in early arthrosis with slight deformity of the femoral head.

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Triple pelvic osteotomy was described by Le Coeur (1965) and Hopf (1966). Both operations were technically difficult and have subsequently undergone numerous modifications. Kotz et al. (1989, 1992) described a polygonal pelvic osteotomy which rotates the dysplastic acetabulum forward and permits stable internal fixation (Figures 1 and 2). This operation requires exposure through 3 incisions, approaching the ischium dorsally. We have developed a simpler exposure which seems easy, safe, and quick.

Patients and methods

In 1990 and 1991 we performed 12 triple polygonal osteotomies of the acetabulum, 4 using the technique of Kotz et al. (1989) and the others our modified approach. 2 patients also had transposition of the greater trochanter. We have followed the patients for 9 (6–20) months. There were 3 men and 9 women, aged 19 (14–33) years. 4 patients had not been treated previously; 5 had been managed conservatively in childhood for congenital dislocation of the hip with a derotation osteotomy of the femur subsequently performed in 2; and 1 had undergone a varus derotation osteotomy at the age of 21 following Perthes' disease. Radiographs showed a dysplastic acetabulum but a normal outline of the femoral head in 5 cases and slight deformity in 7 cases, but oblique views showed a congruent joint in all these patients (Figure 4), with slight narrowing of the joint space in 4. The Wiberg (1939) angle was not less than minus 10° in any case.

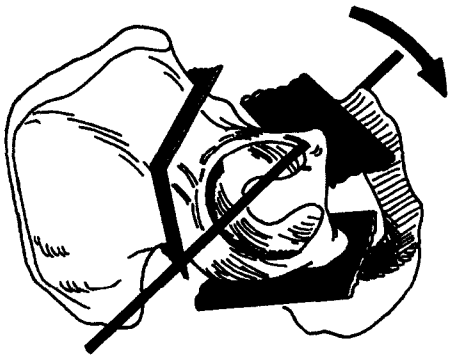

Figure 1. The lines of osteotomy through the innominate, ischial and pubic bones are indicated. The axis of rotation of the acetabulum is parallel to the superior ramus of the pubic bone.

Figure 2. Sketch of the operation from an oblique radiograph. Forward rotation of the acetabulum of 38° has been achieved. The compression plate of David-Uyka is sketched.

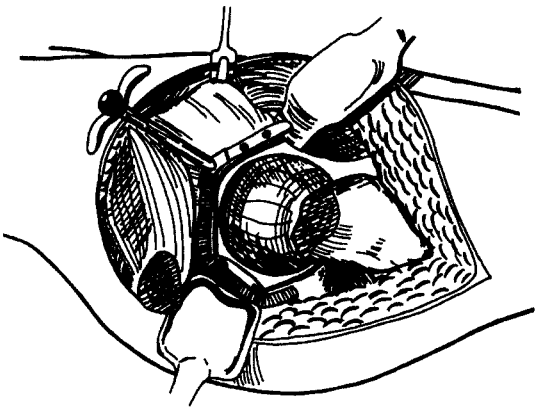

Figure 3. The new approach, with osteotomy of the greater trochanter. The template for the polygonal osteotomy has been applied. The glutei are reflected upwards.

The operation

The patient was placed in the lateral position. After rotating the patient slightly backwards an incision was made parallel to the inguinal ligament. The origin of the adductor muscles was partly detached, and the bone exposed subperiosteally. The neurovascular bundle was retracted laterally, and the superior ramus divided with an oscillating saw. The patient was then turned slightly forwards and an anterolateral incision made above the hip joint. The space between the gluteus medius, the tensor fascia lata was identified, and the origin of the gluteus medius and minimus was detached above the acetabulum as far as the middle of the wing of the ileum. A trochanteric osteotomy was then performed, and the trochanter reflected superiorly with the gluteus medius and minimus. The sciatic nerve was now identified, and after retraction of the nerve, the obturator internus and the gemelli were divided. Elevators were then driven under the ischium and the innominate bone from in front and behind. The whole operating field was now exposed and the appropriate template positioned on the surface of the bone above and behind the acetabulum (Figure 3). Osteotomy of the innominate bone and of the ischium was then performed along the polygonal line with an oscillating saw, and completed with a chisel. A Steinmann pin was then placed in the acetabular fragment, which was rotated forward (Figure 2).

A dynamic compression plate was applied to stabilize the osteotomy (Figure 4). If the proximal femur was normal, the greater trochanter was reattached at its original position with a cancellous screw (Figure 4), but distal transfer was sometimes required.

Postoperative management

The patients were mobilized on the third or fourth day, partial weight bearing on crutches, and physiotherapy commenced. Full weight bearing was allowed after 2 weeks.

Results

At follow-up, all patients were painless and had returned to their original occupation, but one was inconvenienced by a 20° flexion deficiency. There were no complications. The average improvement of the Wiberg CE-angle was 23°.

Discussion

In children repositioning of the acetabulum can be achieved by only 1 osteotomy performed on the innominate bone (Salter 1961), but in older patients division of the pubis and ischium is also required. The main technical difficulty in triple pelvic osteotomy is adequate exposure of the ischium. Many techniques for exposure and osteotomy have been described (Le Coeur 1965, Hopf 1966, Steel 1973, Sutherland and Greenfield 1977, Tönnis 1979, Ganz et al. 1988). The polygonal pelvic osteotomy (Kotz et al. 1989) is an improvement of earlier methods, but it is performed with the exposure described by Tönnis (1979). We have used this approach for some years and have encountered difficulties in dividing the acetabulum along the template, since it requires work simultaneously from both the lateral and posterior exposures. Our modification is to approach the ischium through an anterolateral incision after osteotomy of the greater trochanter to allow retraction of the gluteus medius and minimus proximally. The approach to the superior pubic ramus medial to the femoral neurovascular bundle is simple and allows adequate positioning of the osteotomy. The cut ends of the superior ramus will then rotate on each other.

We feel that as long as the joint surfaces are congruent on an oblique radiograph, our operation may be undertaken, since rotation of the acetabulum will be adequate to compensate for the deformity.

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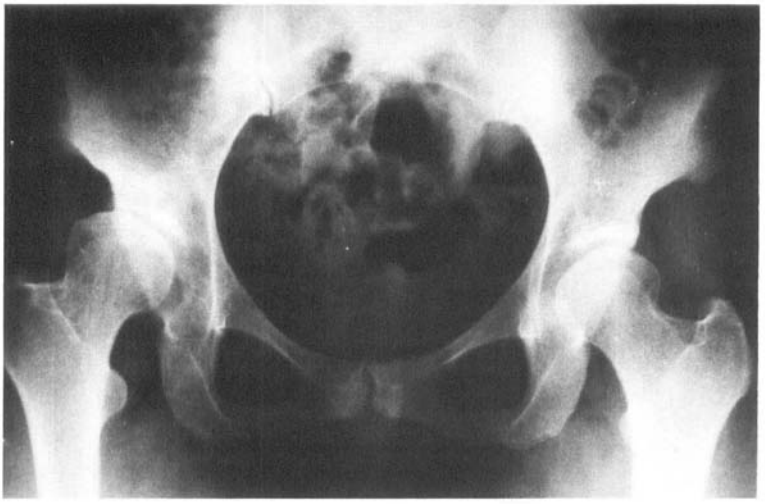
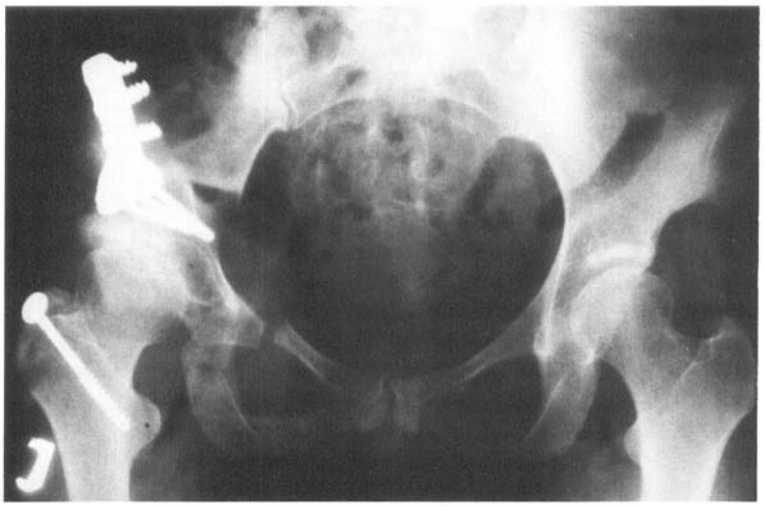
Figure 4. A 33-year-old woman had a dysplastic acetabulum with a spherical femoral head and a narrow joint space.



Before the operation.

Oblique view.



After the operation.

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