Polygonal triple osteotomy of the pelvis
A correction for dysplastic hip joints

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Summary. A new triple osteotomy, polygonal pelvic osteotomy (PPO), is described for use in dysplastic hips. The hip joint must be congruous with a centre-edge (CE) angle between +20° and -10°. Templates are used before and during operation which allow precise correction of the position of the acetabulum. The geometry of the osteotomy and a special compression plate achieve sufficient stability to permit early mobilisation. Surgery is indicated in adolescents and young adults if pain persists for at least two months. The surgical exposure, operative technique and postoperative management are presented, with the two-year results in nine cases.

Résumé. Les auteurs présentent une nouvelle triple ostéotomie (ostéotomie pelvienne polygonale – OPP) pour luxation congénitale de la hanche. L’articulation coxofémorale doit être congruente avec un angle CE compris entre +20° et -10°. L’emploi de modèles, tant avant qu’au cours de l’opération, permet une correction précise de la position du cotyle. La géométrie de l’ostéotomie, combinée à la plaque à compression spéciale de DaVid-Uyka, autorise une mobilisation précoce. L’intervention est indiquée chez les adolescents et les adultes jeunes si les douleurs durent depuis deux mois au moins. L’abord chirurgical, la technique et le traitement postopératoire sont décrits, ainsi que les résultats obtenus dans neuf cas, avec un recul de deux ans.

Introduction
Numerous methods have been described for enlarging the acetabular roof in hip dysplasia. In 1891, König improved a shallow acetabulum by reflecting the outer cortex of the ilium downwards to the joint capsule [10]; later acetabuloplasties have been described by Albee [1] and Jones [9] in the United States, and in 1927 by Lance [13]. Before that, Spitz had developed a grafting procedure [16]. None of these methods produce a biomechanical improvement or enlarge the actual acetabulum. The osteotomy described by Chiari divided the pelvic ring and combined acetabuloplasty and displacement [3]. Salter achieved redirection of the acetabulum in younger children by his innominate osteotomy [15] and prepared the way for triple osteotomies. During the past two decades, multiple osteotomies have been used with increasing frequency. They were first described by Blavier and Blavier [2], Hopf [7], Wagner [20], Le Coeur [14], and Eppright [5], although few osteotomies were performed by these methods. The osteotomies described by Steel, Sutherland and Greenfield [18], Tönns [19], and finally Ganz [6] have been used more often. Difficulty in planning the exact angle of displacement and the plaster cast immobilisation after operation were the main disadvantages of these major procedures. The so-called dial osteotomy was first described in 1970 by Eppright [5] and comes closest to the polygonal pelvic osteotomy (PPO), since the acetabulum is turned like the dial of a telephone. None of these operations uses an angled cut at the roof of the acetabulum as is done in the PPO. Immediate mobilisation after a triple pelvic osteotomy stabilised by compression plate in dogs [4] led to the development of a similar procedure in man. Exact planning and the stability...
Fig. 1. Diagram showing the osteotomy in a false profile view before and after anterolateral rotation of 38° using a Steinmann pin.

Fig. 2. False profile view with template centred over the centre of the femoral head.

Fig. 3. Modified false profile angle (F): 45° in men and 55° in women.

Fig. 4a, b. Cranial view of the rotation phases of the acetabulum: a lateral displacement, b displacement around the axis of the pubis.

The indication for the PPO is limited by the size of the acetabulum. Dysplasia with a CE angle of +20° to −10° can be treated satisfactorily; if the dysplasia is more severe, sufficient cover cannot be achieved and with a greater angular displacement the acetabular fossa would be moved into the load-bearing area. In these cases with grade III and IV dysplasia [21], we still use the Chiari pelvic osteotomy.

Surgical technique

The patient is placed in a lateral position with the leg freely moveable and can be turned forwards or backwards. Three skin...