Indications for Treatment in Coxa Plana* (Legg-Calvé-Perthes Disease)

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**Summary.** Degrees of epiphyseal alterations are described: no subluxation, subluxation, and crushing. Subluxation is determined by measurement of the acetabulum-head index. Determination of crushing is described, using Mose's template for measurement. A prospective method for establishing indications for treatment is presented, according to both age groups and degree of epiphyseal alteration.

Résumé. Les altérations épiphysaires sont décrites à divers stades de leur évolution: sans ou avec subluxation jusqu'à l'affaissement céphalique.

Le degré de subluxation est défini par la mesure de l'index céphalo-acetabulaire.

Pour la détermination du degré d'aplatissement céphalique les mesures sont effectuées en adoptant l'échelle de Mose.

Tenant compte tant de l'âge du patient que du degré de déformation épiphysaire, l'auteur propose une méthode rationnelle destinée à établir les indications thérapeutiques.

**Key words:** Coxa plana, Legg-Calvé-Perthes, Hip

Outcome of coxa plana depends on both the age of the patient when presenting for treatment, and the degree of epiphyseal alteration found at examination, as well as on the proper method of treatment. Generally speaking, at age of 6 or less, the results are usually good even without treatment; at age 7–9 good results can be achieved by the proper kind of treatment; at age 10 and over good results cannot be expected by the standard methods of treatment. If there is no subluxation, conservative means are sufficient to maintain the epiphysis inside of the acetabulum; subluxation requires correction by osteotomy; still, no osteotomy can help if a subluxated epiphysis has already undergone crushing. Therefore, before starting any treatment, the degree of epiphyseal alteration should be recognized. Since its exact determination is impossible by visual impression only, appropriate measurements should be used.

Subluxation is present if the acetabulum covers less than 90% of the epiphysis. For measuring the subluxation we use the acetabulum-head index [2]: the covered breadth of the epiphysis is multiplied by 100, and then divided by the total breadth of the epiphysis (Fig. 1). An acetabulum-head index smaller than 90 means subluxation.

![Fig. 1. Measurement of subluxation. Covered breadth of epiphysis is 28 mm. Total breadth of epiphysis is 33 mm. Acetabulum-head index \( \frac{28 \times 100}{33} = 85 \) shows subluxation, because it is less than 90](image)

Crushing is present if the subluxated epiphysis has undergone real flattening due to pressure of the acetabular rim on the femoral head, which produces either a compression fracture or a "plastic" [4] impression. The articular height is thus severely

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Fig. 2. Measurement of crushing. Transparent Mose's template (with 2-mm-distant circles) is positioned on A-P radiograph in such a way that outline of visible remnants of epiphysis fits an appropriate circle. This circle (marked thickly in the figure) overlaps outline of acetabular roof. It denotes crushing of epiphysis.

Reduced, no sufficient space being left for regeneration of a spherical femoral head. For measuring crushing, we use Mose's template [3] on A-P radiography. The outline of the visible remnants of the epiphysis is fitted in the appropriate circle. If this circle overlaps the acetabular roof, it means that crushing has already occurred (Fig. 2). If the appropriate circle lies below the acetabular roof, no crushing is present, and the flattening is only apparent (Fig. 3). In such cases the cartilaginous, radiologically translucent part of the epiphysis is maintaining its height and spherical shape, despite the subluxation.

Results

Results were studied in 130 hips of hospital patients which were (1) untreated, (2) treated by conservative methods, or (3) treated by femoral osteotomy. For evaluation of the results, we used the modified Mose's assessment method.

In the age group up to 6, showing no subluxation on X-ray, similar, generally excellent results were obtained by any of the three procedures. It can be concluded that osteotomy is unnecessary in such patients. Whether they should be simply observed, or whether conservative treatment should be applied, depends on the severity of clinical symptoms and response to simple bed rest.

In the age group 7–9, without subluxation, obviously better results are obtained by conservative treatment than by osteotomy. Our conclusion is that in such patients only conservative treatment is indicated.

In the patients aged 10 or more, without subluxation, the results were always poor, irrespective of the management applied. Our results indicate that another solution should be searched for. At present innominate osteotomy combined with iliopsoas release is being tested, but the results are as yet inconclusive.

In the patients aged up to 6 years, with subluxation, results were similar in both untreated and osteotomized hips: good and excellent. In cases in which conservative treatment was applied, we had to resort to osteotomy later, due to persisting, even worsening, subluxation, following many months of nonoperative procedures. Therefore, as mentioned above, we concluded that according to the clinical symptoms, the decision is between simple observation and treatment. If treatment is needed, osteotomy is the procedure of choice in such patients.

In the age group 7–9, with subluxation but without crushing, the results of osteotomy were mostly good, whereas poor results were obtained by conservative treatment, as well as in untreated patients. The conclusion follows that osteotomy is the proper treatment in such patients.

In the age group of 10 and beyond, with subluxation and without crushing, the results in all patients were poor. Because of their similarity with the next group, the two will be discussed together.