FROM THE ORTHOPEDIC DEPARTMENT OF KAROLINSKA INSTITUTET
CHIEF: PROFESSOR STEN FRIBERG

OPEN REDUCTION OF CONGENITAL DISLOCATION OF THE HIP JOINT

Anatomic, clinical and radiographic studies

By

CARL HIRSCH, M.D.

It is now generally acknowledged that closed reduction is not a sufficiently reliable method of treating congenital dislocation of the hip. Sometimes reduction is difficult to bring about and sometimes it fails despite energetic attempts. Furthermore, even if an acceptable position is achieved, there is considerable risk of both re-dislocation and subluxation later on. In addition, we have the long-range danger of osteoarthritis with functional disorders (Wiberg, Severin, Platou, Jakobsson, *et al.*). Thanks to Severin and Jakobsson, we have statistical proof that the late results do not fulfill the promise of the primary results.

Many different factors have been blamed for unsatisfactory results: poorly developed acetabular roof, interposition of the limbus and joint capsule in the acetabulum, pronounced anteversion of the neck of the femur, fixation of too short duration, traumatisation of the head of the femur on reduction or during the subsequent treatment. Advances in surgery, as well as the legitimate criticism of the conventional method of treating dislocation, have stimulated many of us to experiment with open reduction. During the forties, Leveuf was one of the most outstanding advocates of a more active surgical treatment. Today, the Judets in Paris and Somerville in Oxford represent the same school of thought. Nevertheless, the majority of orthopedic surgeons still regard open reduction as a risky undertaking which seldom leads to encouraging results.

Somerville recently explained why closed reduction is doomed to fail in certain cases. Severin elucidated the variations in the position of the limbus, but Somerville deserves the credit for having pointed out that an improvement in the situation can be achieved by surgery. As

simple a measure as resection of the limbus may ensure stability of reduction.

Almost two years ago, I began to carry out reductions through a posterior approach. Friberg had re-introduced this approach into the Department for use in arthroplastic operations on adults, and at the same time we realized that it provides excellent access to the hip joint. As we know, the posterior area of the hip joint can be dissected free through an incision along the posterior margin of the greater trochanter (Langenbeck-Gibson). If the gluteus maximus is divided in the direction of the fibers, the head of the femur can be palpated between the gluteus medius and the external rotators. The gluteus medius can be moved upward and the external rotators downward by blunt dissection, whereupon the femoral head, which is covered by the joint capsule, will become visible. If an incision is made in the posterior part of the capsule, the femoral head can be drawn backward and the acetabulum can then be inspected.

Hitherto 13 hip-joints have been explored as described above. All the cases represented congenital dislocations which had defied repeated attempts at closed reduction. In every one of these hips the limbus was situated in the joint in the manner described by Somerville. It lay like a cartilaginous plate at the upper acetabular rim. It had not been dislocated or forced into its position by pressure from its surroundings. This deviation in the position of the limbus apparently represents an element in the congenital deformity in some cases. In none of our cases could this "semilunar cartilage" be brought into a normal anatomic position. Sometimes an incision along the acetabular margin of the limbus sufficed to mobilize it out of the joint cavity, but in other cases either the entire limbus or the greater part of it had to be resected.

We soon found, however, that the position of the limbus was not always the only obstacle to successful reduction. *The limbus was frequently but one of the hindrances to bringing the femoral head down into the acetabulum.* In these cases the acetabulum was more or less filled with other soft parts, which divided the joint cavity into two compartments as with a membrane. This membrane consisted of the joint capsule, which was attached to the acetabular rims in varying degree. In some cases the capsule covered the whole acetabulum, completely concealing its articular cartilage.

Fig. 1, which is reproduced from Severin's paper, shows the normal anatomy. Fig. 2, also by courtesy of Severin, represents an arthrogram which shows a dislocated limbus and the course of the capsule. In Figure 3 I have tried to show how the capsule may act as a membrane preventing the femoral head from reaching the floor of the acetabulum.

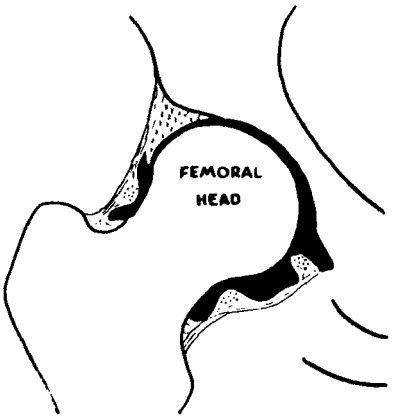

Fig. 1.

Fig. 2.

Since the capsule is attached at the upper acetabular rim outside the dislocated limbus, reduction is completely impossible and the femoral head cannot even be displaced in the direction of the acetabulum. The capsular attachment outside the limbus constitutes an impenetrable barrier. In these cases the joint cavity is divided into two completely separate compartments, an inner one, behind which is the joint cavity, and an outer one containing the femoral head. First the capsule must

be forced. In these cases excision of the capsule is a prerequisite for reduction. When that has been done, the femoral head can be placed in position *even if the limbus is displaced into the joint*. Now, though, the limbus prevents the femoral head from reaching the floor of the acetabulum. The interposition caused by the limbus is the reason that redislocation easily takes place when the leg is brought down. A stable position is achieved, however, after resection of the limbus.

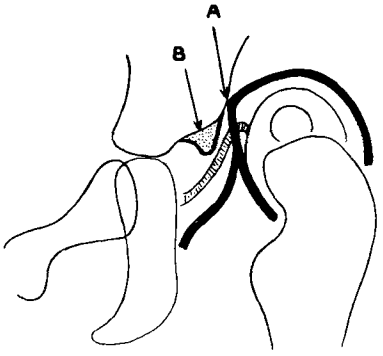

Fig. 3.

Following excision of both capsule and limbus, we tried varying degrees of abduction and flexion in order to find the position that gives firmest reduction. We found that approximately 60 degrees of abduction and 60 degrees of flexion gave the most satisfactory position. Too pronounced abduction entailed a tendency toward anterior dislocation and too great flexion a risk of inferior dislocation. There was little risk of postero-superior dislocation, on the other hand, particularly in the cases in which we had been able only to loosen the limbus from the acetabulum and place it outside the femoral head.

Plaster was applied, with the hip in 60 degrees flexion and 60 degrees abduction, after the wound had been closed with a few sutures in the gluteus maximus and the tensor fasciae latae. No sutures were made in that posterior part of the capsule where the first incision was made.

At first we left the plaster in place for six weeks. However, this led to pronounced rigidity, which took many months to overcome. Later when we had learned that the risk of recurrent dislocation was very slight, we reduced the period in plaster to two or three weeks. It would seem that the scar which forms around the upper rim of the acetabulum

Open reduction of dislocated hips.

Case no.	Sex	Dislocation: Right hip	Dislocation: Left hip	Age at the first attempt of closed reduction	Age at open reduction: Right hip	Age at open reduction: Left hip	Time in plaster	Time of follow up	Note
1	F	+	+	23 months	—	24 months	2 weeks	25 months	
2	F	—	+A	9 months	—	45 months	3 weeks	20 months	
3	F	+	+A	4 months	29 months	26 months	6 weeks	19 resp. 17 months	
4	F	+	+A	11 months	22 months	—	6 weeks	18 months	Dislocation anteriorly
5	F	+	+A	18 months	30 months	32 months	6 weeks	16 months	Dislocation anteriorly
6	F	—	+	15 months	—	26 months	6 weeks	15 months	
7	F	—	+	3 months	—	9 months	4 weeks	10 months	
8	F	+	+	26 months	28 months	30 months	2 weeks	3 resp. 1 month	
9	F	—	+	17 months	—	19 months	2 weeks	2 months	

Fig. 4.

Fig. 5.

and which we have observed at later operations, suffices to prevent redislocation. All fixation was removed after four weeks. The week before it was taken off, the plaster was split in order to permit a few minutes of movement every day. Physical therapy was then given until the almost normal mobility had been achieved and the care of the child could be entrusted to the parents. At first physical therapy must be very gentle because it causes severe pain, probably due to adhesions.

The table in Fig. 4 covers the cases so far operated on and followed-up for a certain period. Altogether ten cases have been treated. One reduction was a failure—the child had pronounced arthrogryposis. Twelve hip joints were treated in the remaining nine patients, six of the cases being unilateral and three bilateral. Anterior dislocation occurred in one unilateral and one bilateral case as a result of too great abduction at fixation. Thus, good primary anatomic results were achieved with open reduction in nine hip joints. Fig. 5 shows the result after an operation.

All the children operated on are under continuous supervision. At the time of writing, the period of observation has been longer than 1.5 years in four cases and more than one year in six cases. Unfortunately, the follow-up examinations have revealed that open reduction is not the source of satisfaction that we believed it would be at the outset. Only one year after operation, roentgenograms showed incipient osteochondritis deformans juvenilis, which progressed during the second year. Obviously one may question the worth of a method of treatment with such grave consequences. It remains for continued controls to show us whether there is any justification for retaining the technique in question.

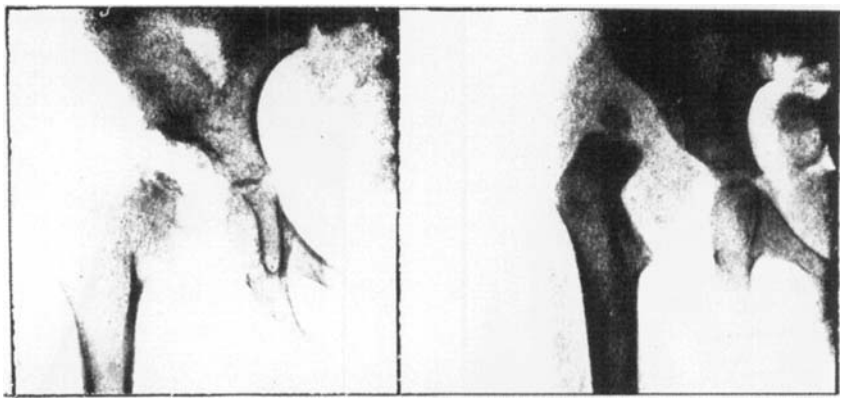

Fig. 6.

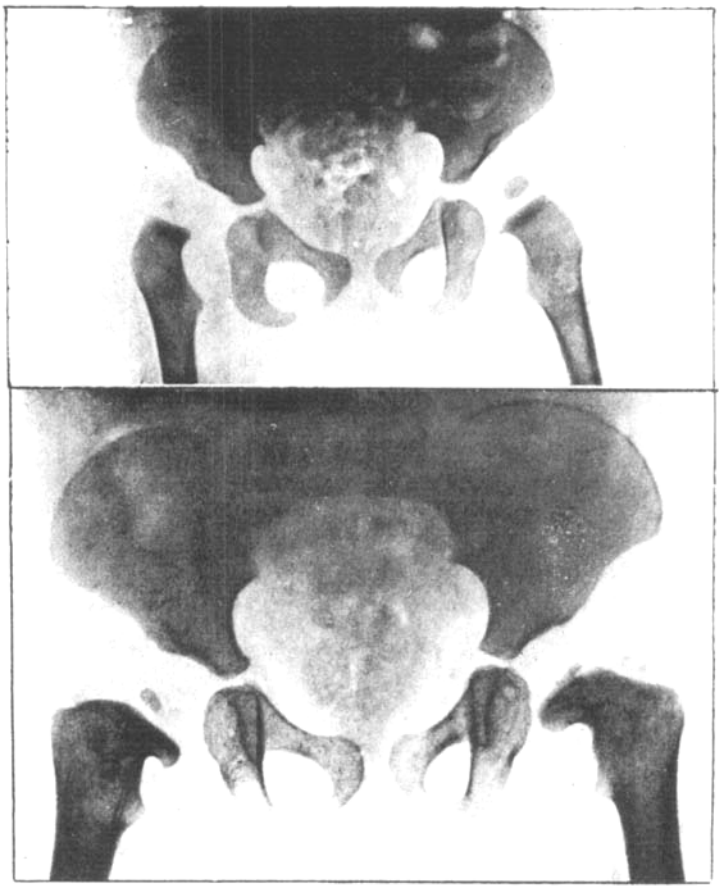

Fig. 7.

Fig. 8.

For the time being we must confine ourselves to a discussion of the possible background of this disturbance in the development of the femoral head. It may be that the reduction resulted in such great pressure on the head that nutritional conditions were upset. However, this is hardly plausible. In the first place, reduction is easily achieved and abnormal pressure was not observed primarily in any of the cases. It seems more likely that the incision in the posterior area of the joint capsule injured the vascular supply with resultant necrosis. It is possible that greater care must be exercised with regard to the important

arteries of the capsule if the operation is to be practicable. If this line of reasoning is correct, it would indicate that osteochondritis deformans juvenilis is a condition that can be produced by injury to the arterial supply of the capsule. Experiments on animals should give an answer to this question. Meantime, the possibility cannot be disregarded that the ligamentum teres, as well as the capsular arteries, was damaged by the operation. The extent to which the circulatory disorders affected the ligamentum teres and the capsule, respectively, cannot be judged at this time.

SUMMARY

Open reduction in congenital dislocation of the hip was carried out by a posterior approach (Langenbeck-Gibson incision). Thirteen hip joints were operated on after closed reduction had proved a failure. In all the cases the limbus was dislocated into the acetabulum. Frequently the acetabulum was also more or less covered by the capsule, attached to the acetabular rims. Reduction was easily achieved after a combined capsule-limbus excision. The most stable position of the femoral head was obtained with the leg fixed in 60 degrees abduction and 60 degrees flexion. Immobilization in plaster was restricted to only two or three weeks. Despite good primary function, roentgenographic changes highly reminiscent of osteoarthritis deformans juvenilis developed in the femoral head during the course of one year.

RESUME

Une réduction ouverte dans un cas de dislocation congénitale de la hanche a été pratiquée par rapprochement postérieur (incision Langenbeck-Gibson). Treize articulations de la hanche ont été opérées après que la réduction fermée s'est révélée un non-succès. Dans tous ces cas, le limbe était disloqué jusqu'à l'acétabulum.

Fréquemment, la cavité de l'articulation était aussi plus ou moins recouverte par la capsule rattachée au bord le l'acétabulum. La réduction a été accomplie facilement après une incision combinée capsule-limbe. La position la plus stable de la tête fémorale est obtenue en fixant la jambe en position de 60° d'abduction et de 60° de flexion. L'immobilisation dans le plâtre a pu être limitée à deux ou trois semaines. Malgré une bonne fonction primaire, les altérations radiographiques rappellent beaucoup l'ostéoarthrite déformante juvénile qui se développe dans la tête fémorale en l'espace d'une année.

ZUSAMMENFASSUNG

Blutige Einrenkung von angeborener Hüftverrenkung wurde mittels des rückwertigen Zuganges (Langenbeck-Gibsons Inzision) ausgeführt. Dreizehn Hüftgelenke wurden operiert, nachdem die unblutige Einrenkung sich als unmöglich erwiesen hatte. In allen Fällen war der Limbus in des Acetabulum hinein verschoben. Häufig war der Gelenksraum auch mehr oder weniger von der am Acetabularrande ansetzenden Kapsel bedeckt. Die Einrenkung liess sich nach Excision von Kapsel und Limbus leicht durchführen. Die beste Sicherung des Femurkopfes wurde mittels einer Fixierung des Beines in 60° Abduktion und 60° Flexion erhalten. Die Ruhigstellung im Gips wurde nur für 2 bis 3 Wochen aufrechterhalten. Trotz anfänglicher guter Funktion entwickelten sich im Verlaufe von einem Jahre röntgenologische Veränderungen, die sehr denen der osteoarthritis deformans juvenilis des Femurkopfes glichen.

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