OSTEOCHONDritis Dissecans of the Hip*

M. Guilleminet and J. M. Barbier, Lyon, France

Travail de la Clinique de Chirurgie Orthopedique de Lyon

This work is concerned with a particular type of osteonecrosis which, because of its spontaneous occurrence and its anatomical features, must be regarded as distinct from aseptic necrosis of the head of the femur occurring after severe injuries to the hip or in "caisson disease."

The osteochondritis dissecans discussed here was first described by Paget (1870) and named by König (1887). Its best known appearances are in the elbow and knee, whereas affection of the hip is distinguished by its rarity. It was described in France in 1932 by Moulougnet (who published later several articles about it). His study of the condition was very completely repeated by King and Richards (1940), who then found some thirty published cases, though in fact the present knowledge of the anatomical and radiological syndrome should considerably facilitate recognition. In the same way we found ourselves in a short time confronted with several instances of the condition, and, on reviewing the files of the orthopaedic clinic in Lyons covering the last fifteen years, we collected from them eight cases. One of these in particular is of a girl, nineteen years of age, treated in 1947 by one of us for a chronic arthritis of uncertain origin. Looking at the film again after an interval of eight years we were able to classify the condition under osteochondritis dissecans of the hip. At the same time this case made us appreciate the spontaneous development of the condition in a young subject. Comparison of our eight cases (Table I) with previously published observations induced us to renew the study of the condition.

Pathological Anatomy

The anatomy of the lesion is well known from the findings at operation. The femoral head having been dislocated (an essential step in the full examination), one finds that on the whole the joint appears normal. The articular cartilage of the upper part of the head, outside the fovea capitis, is yellowish in colour, rather like old ivory. It is often wrinkled or "grained" and has been likened to the skin of the hand macerated under a wet dressing. This zone of cartilage can easily be depressed with a blunt instrument. When the cartilage has been divided, partial sequestration of the capital "nucleus" is revealed. The sequestrum represents the characteristic lesion of the disease. It occupies a cavity in which it can move slightly; it is easily removed, and then one can see that it resembles a fairly typical "joint loose body" with an upper surface of cartilage and a lower surface of fibrocartilage and an intermediate bony layer. It is circular, with a diameter of two to two and a half centimetres, thicker in the centre than at the circumference, and its general shape has classically been compared to that of an old coin. The base of the cavity is covered with fibrocartilaginous tissue. It all looks as if a portion of chondrifying tissue were sinking into the head in such a way as to become isolated (Fontaine 1953).

Although these are the typical anatomical features of the condition there are certain particular variations. Much more rarely the sequestrum is completely cartilaginous, and the affected part of the femoral head is covered with veritable blisters. Superficial sequestration of the infero-internal portion of the head in the joint space has been encountered. A cotyloidal site for the body is classical though we did not encounter a convincing case. Histological

* The translator, Professor Bryan McFarland, has retained some of the authors' forms of expression, though the translation is necessarily free.
examination demonstrates dead bone compressed between two layers of living fibrocartilage. Inflammatory signs were never found, nor were lesions indicating vascular obliteration (Sceur 1951).

**ETIOLOGY**

Two of our observations have particular interest. They are concerned with children who at the time of the first examination were eleven and twelve years of age (Cases 1 and 2). In the first the trouble had begun at the age of one year, and in the second at the age of ten months. This conforms with statements in the literature (Gold 1930) thirteen years, Francillon (1932) fourteen years, Müller (1933) fourteen and twelve years.

**TABLE I**

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Sex</th>
<th>Age</th>
<th>Clinical history</th>
<th>Radiographic appearance</th>
<th>Condition when examined first</th>
<th>Treatment</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F</td>
<td>11</td>
<td>One year: sudden onset. Pain</td>
<td>Typical: large sequestrum</td>
<td>August 1947. Limitation of movement</td>
<td>Plaster three months</td>
<td>April 1955: Subluxation with osteoarthritis (Fig. 2) Arthrodesis performed later</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>18</td>
<td>Two years: sudden onset. Pain</td>
<td>Typical: large sequestrum: half the head</td>
<td>March 1943. Deformity. Marked limitation of movement</td>
<td>Resection and remodelling</td>
<td>February 1944: ankylosed hip</td>
</tr>
<tr>
<td>6</td>
<td>M</td>
<td>25</td>
<td>Two and a half years: insidious onset. Pain</td>
<td>A thick sequestrum from the inferior part of the joint space</td>
<td>June 1942. Deformity. Limitation of movement</td>
<td>Sequestrum removed</td>
<td>June 1943: No pain. Slight limitation. The hip was not radiographically normal</td>
</tr>
<tr>
<td>8</td>
<td>M</td>
<td>51</td>
<td>Sixteen months: sudden onset after violent trauma</td>
<td>Typical: large sequestrum and arthrosis</td>
<td>August 1953. Ankylosis</td>
<td>Acrylic arthroplasty</td>
<td>April 1955: Failure</td>
</tr>
</tbody>
</table>

When first seen our two patients were considerably over the age for Legg-Calvé-Perthes disease, and moreover their pictures were certainly characteristic of osteochondritis dissecans. This led us to consider again an absolute differentiation such as one has often wished to establish between these two conditions. It may be admitted that the appearance of a capital necrosis of the type of osteochondritis dissecans of the hip in the latter years of childhood—say from eleven onwards—may be a transitional phase between Legg-Calvé-Perthes and König's disease. An essential distinguishing feature, we think, would be the capacity for reconstruction of the dead nucleus, which is practically constant in the child of six to seven years with Legg-Calvé-Perthes disease, but most uncertain on the contrary from fifteen years onwards as in König's disease. Between these two ages there could exist intermediate cases.
Case 1. Figure 1—Osteochondritis of the left hip in a girl of eleven years. Early lesion diagnosed as osteoarthritis. Treatment: plaster for three months. Figure 2—Condition eight years after the first examination.

Case 2. Figure 3—Osteochondritis dissecans of the right hip in a boy of twelve years. Typical radiological appearances. Treatment: simple arthrotomy. (Radiograph immediately after operation.) Figure 4—Condition seventeen months later.
OSTEOCONDRTIS DISSECONS OF THE HIP

which can achieve normal or very nearly normal reconstruction, as is demonstrated in one of our cases (Case 2) though sometimes the hip may become seriously distorted (Case 1, Figs. 2 and 4). The difficulties of clarifying cause and effect are illustrated by one of our patients, a man of fifty-one years of age suffering from degenerative arthritis associated with osteochondritis dissecans of the hip. This man's trouble had started fifteen months before our examination and was associated with violent injury to the hip (Fig. 5). The possibilities are that his arthritis had resulted from injury to a hip affected by osteochondritis, which, though old-standing, had up to that moment been "silent," or that everything had happened as a result of the accident alone. Dr. P. Moulonguet studied this case, which is the only one in our series in which we can point clearly to injury as a factor. All our other cases arose spontaneously. Moreover, in thirty recorded cases that we reviewed, injury was mentioned only four times. In our eight cases none was bilateral. Though classically "bilateral" is frequent we were in fact only able to find four cases out of thirty. We found none in which the condition was familial. Finally in two of our patients there was pre-existing malformation of both femoral heads. This factor has already often been mentioned and no doubt these slight dysplasias, because they upset articular mechanics, may favour the appearance of osteochondritis dissecans.

CLINICAL STUDY

Clinically we have nothing original to report. In the early stages there is always pain, and this is usually slowly progressive. Yet it can become acute and rapidly increase, as in three of our cases, in one of Fontaine (loc. cit.) and in one of King (loc. cit.). This first painful phase, which is sometimes long drawn out—up to twenty years—is followed by loss of function, which may be severe (Cases 7 and 8) and may go on to complete stiffness. Prolonged observation of the type which is secondarily bilateral has shown that the radiographic lesions appear long before the clinical signs. Contrary to the usual clinical picture, radiographic features are most characteristic and correspond in a precise manner to the anatomical findings. In the great majority of cases one sees the outline of a sequestrum situated in the superolateral pressure zone of the femoral head. It is long and narrow, and is thickened a little in the middle. It is usually about the size of the kernel of a small almond nut, but may sometimes take up to one-third or one-half of the surface of the head (Figs. 6 and 8).

The sequestrum is little different in density from that of the rest of the head; it is usually homogeneous, and the margin is always demarcated by a thin clear line. The lesion is entirely self-contained, except for a slightly crinkled appearance of the adjacent acetabular roof and occasionally co-existent arthritic changes. As has been pointed out, sometimes one finds the sequestrum situated in the lower and inner part of the joint space (Case 6, a case of Bergmann (1929), Fig. 9). Finally the lesion is at times of the "sequestre mince" type, which is seen as a simple irregularity of the surface of an otherwise normal femoral head. This is occasionally difficult to demonstrate and necessitates radiographs taken from varying angles (Fig. 7).

Given such appearances it is nearly always easy to recognise straightforward osteochondritis dissecans of the hip. Difficulty arises when there are secondary arthritic changes which mask the primary lesion. It is also true that somewhat comparable findings may be encountered in cases of epiphyseal necrosis resulting from fractures of the femoral head or from dislocation of the hip. Then, however, the sequestrum is more opaque and is surrounded by osteoporosis. The same applies to caisson disease, in which the sequestrum is encased in a diffusely affected femoral head (Fig. 12). In these cases if the radiological interpretation is open to doubt the previous history provides the explanation of the cause. It may happen that in certain forms of coxalgia the diagnosis may not be quite clear. Reviewing fifty cases of primary coxalgia in the adult treated at this clinic we found two whose appearances recalled that of osteochondritis dissecans of the hip, and it was necessary to keep one of these under observation for a long time until the appearance of an abscess settled the question (Fig. 8).
Fig. 5
Case 8—Osteochondritis dissecans of the left hip in a man of fifty-one years. Severe lesion associated with signs of osteoarthritis. Operative confirmation of the diagnosis of osteochondritis dissecans.

Fig. 6
Case 5—Osteochondritis dissecans of the right hip with typical radiological appearance. Distinct malformation of both femoral heads. Irregularity of the surface of the left femoral head, possibly representing a thin sequestrum.
FIG. 7
Case 4—Osteochondritis dissecans of the left hip. Appearance of thin sequestrum. Distinct malformation of both femoral heads.

FIG. 8
Case 7—Osteochondritis dissecans of the right hip in a man of thirty-six years. Destructive form, presenting a major and rapidly progressive (six months) clinical picture. Clinical appearance of pseudocoxalgia. Operative confirmation of diagnosis of osteochondritis dissecans.
EVOLUTION

The course of the condition, as we have seen, is often prolonged. The end result is a severe impairment of function and a secondary arthrosis. In contrast to osteochondritis dissecans at other sites the necrotic nucleus never seems to act like a loose body free in the joint. There are cases, particularly in young people, where one has witnessed the regeneration of a subnormal head. Such was the case in one of our patients who was seen for the first time eight years ago (Case 2). But this period of observation is too short, and in practice a guarded prognosis must be given. All the evidence justifies the fear that osteochondritis dissecans of the hip will finally result in an arthrosis. It is therefore important to detect osteochondritis of the hip early and to treat the patient in such a way as to relieve the pain and improve the function and above all to prevent the occurrence of arthrosis. Even so the problem of that rational treatment is not yet perfectly resolved.

![Fig. 9](image1.jpg)  ![Fig. 10](image2.jpg)

Case 6. Figure 9—Large sequestrum lying in the medial part of the joint space of the left hip. Figure 10—Condition six months after removal of the sequestrum.

TREATMENT

Probably one does not yet know with certainty what is exactly the most suitable treatment. It is in fact difficult to assess the relative values of various treatments. In the series we now report, three cases were treated by Tavernier and five by one of us. The methods of treatment and the results are shown in Table II.

A similar diversity of treatment appears in the published observations of other authors. Most recommend surgical treatment. This consists essentially of removing the sequestrum from the head, with the expectation of results just as satisfactory as in the knee or in the elbow.

Unfortunately, in the hip, anatomical considerations are very special and the lesion is situated in the pressure area of the head of the femur. It may be that removal of the affected area allows fibrosis of the pressure zone with healing of the edges of the cavity. But that part of the surface of the head will remain irregular and deformed. This state of affairs seems to lead little by little to osteoarthritis. This is so true that the best of our cases seems to be the one in which the sequestrum was situated outside the pressure zone (Case 6, Fig. 10).
Another factor that makes assessment difficult is that practically no long-term results are known. Most of the patients have not been observed for more than a few months: seldom have they been observed for more than two years, and observation for eight years is exceptional. Such a follow-up is too short to enable one to be sure that osteoarthritis does not occur, even if radiographically the contour of the head seems normal.

Vol. 39 B, No. 2, May 1957
In these circumstances it seems that treatment may be considered along two lines. 1) In a patient less than fifteen years of age one may be tempted not to interfere directly, in the hope that spontaneous revascularisation of the sequestrum will occur. Our second case is in favour of such a course. But our first case, which was seen after eight years, and similarly that of Lange (1929), seen after the same time, have both resulted in osteoarthritis (Fig. 1). 2) In the adult surgical intervention has to be considered when disability is marked. Simple removal of the sequestrum has given good results in two of our cases, in two cases of Moulonguet (1932) after two and a half years and twenty months, in one case of Bergmann (1929) after eight months, in one case of King and Richards (1940) after two months and in another after an unspecified interval, and in two cases by Fontaine (1953) after fourteen months and nine months. But the average duration of follow-up was only about eleven months, and it must be remembered that there were failures (one of Moulonguet, our Case 3). Even in the cases in which the result was said to be good, many were not followed up for long enough. Other operations on the hip have little to recommend them. Our two arthroplasties were failures, although possibly the conditions were not ideal. Even if there is a place for these operations in the old, there is certainly none in the young.

It seems to us, therefore, that the best thing to do is simply to remove the sequestrum. In doing this it must be remembered that, although the sequestrum appears obvious in the radiograph, it is necessary to dislocate the hip in order properly to see the lesion (Moulonguet, loc. cit.; King, loc. cit.). One has to realise that after removal of the sequestrum, the surface, as we have pointed out, will not be quite smooth and regular.

We think it might be a good idea, after removing the sequestrum and curetting its bed, to fill the cavity with a paste of cancellous bone. We tried this, probably a little imperfectly, in Case 7. It would moreover be necessary to cover this paste with fine cartilage grafts, which will probably survive well in the milieu provided by a joint (Moore 1948; Hirsch 1951). Alternatively one could cover the cancellous paste with a skin graft as practised by Kallio (1955).

In all these methods immobilisation in plaster would have to be employed for one month and weight bearing would not be allowed for three to five months.

**TABLE II**

**ANALYSIS OF TREATMENT AND RESULTS (EIGHT CASES)**

<table>
<thead>
<tr>
<th>Nature of treatment</th>
<th>Number of cases</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-operative treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completely untreated</td>
<td>1</td>
<td>Follow-up insufficient (only four months)</td>
</tr>
<tr>
<td>Rest in plaster</td>
<td>1</td>
<td>Eight years later subluxation and arthritis (treated by arthrodesis)</td>
</tr>
<tr>
<td>Operative treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simple exploration</td>
<td>1</td>
<td>Good result after eight years</td>
</tr>
<tr>
<td>Removal of sequestrum</td>
<td>2</td>
<td>One was good a year later. One was fairly good six months later</td>
</tr>
<tr>
<td>Resection and remodelling of the head</td>
<td>1</td>
<td>Ten months later the hip was completely stiff</td>
</tr>
<tr>
<td>Arthroplasty (metal cup)</td>
<td>1</td>
<td>Hip mobile but painful on walking six months later</td>
</tr>
<tr>
<td>Arthroplasty (acrylic prosthesis)</td>
<td>1</td>
<td>Complete failure</td>
</tr>
</tbody>
</table>

THE JOURNAL OF BONE AND JOINT SURGERY
OSSEOCHONDROSIS DISSECASES OF THE HIP

SUMMARY

1. The pathological anatomy of osteochondritis dissecans of the hip is described, and its causation is discussed.
2. Eight new cases are reported.
3. The problems of treatment are considered.

REFERENCES


Paget, J. (1870): On the Production of some of the Loose Bodies in Joints. Saint Bartholomew’s Hospital Reports, 6, 1.


VOL. 39 B, NO. 2, MAY 1957