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Congenital Dislocation of the Hip

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Abstract
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The subject of Congenital Dislocation of the hip (C.D.H.) is so vast and complicated that anyone who attempts to correlate the known facts and numerous hypotheses into a neat, compact monograph, is doomed to failure before he starts. One of the main difficulties is the almost universal disagreement about the various aspects of the disease, whether of aetiology, pathology, diagnosis or treatment. In these pages, I shall confine myself to discussing some of the active steps one can take in the prevention and cure of the condition.

CONGENITAL DISLOCATION OF THE HIP

Diagnosis and Treatment

PETER J. SWARBRICK M.B., Ch.B.

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In very few orthopaedic conditions can early diagnosis have such a profound effect on the eventual result. No longer should we see the type of case so often described in the older textbooks—the waddling gait, hyperlordosis, and pelvic tilt of the fully developed bilateral dislocation. In this respect I find it rather disappointing to say the least that in the latest edition of one Paediatrics textbook, published in 1960, the author is forced to admit that " It is often not until the child attempts to walk that the diagnosis is made." By this stage much damage has already been done, and even if a good eventual result is obtained, treatment is considerably longer, and more complicated.

For this reason, it should be a routine step, during the early examination of the newborn infant, to carry out the few simple tests for instability of the hips, which will show up even at this early stage. Examination as follows takes very little time, and may save much unnecessary hospitalisation.

I. *Loosening of the Hip*—related to the flaxidity of the capsule due to the susceptibility to relaxin—is shown by a diminished active and exaggerated passive mobility.

II. *Assymetry of Buttock Skin Folds*—are very often seen in early cases, although not everyone agrees as to their reliability.

III. *Simple abduction* of the hips is probably the most important individual test—most cases show some limitation of abduction.

IV. The value of *Ortolani's "Click" Test* in the new born is disputed. In this procedure, during rectangular abduction, the femoral head can be felt to "click" over the edge of the acetabulum. Obviously, this requires some subluxation to be already present, and though some people regard it as a suitable test in the young infant, it is probable that it is of little value until later.

Should any of these clinical tests reveal suspicion of an abnormal hip, radiological examination should be made. X-rays should also be taken in any child born into a family with a history of the disease. There can be no excuse for ignoring the influence of heredity.

The chance of any abnormal hip being missed, and proceeding to subluxation can be minimised if, apart from routine examination in hospital-born babies, district Midwives are instructed in these simple clinical tests, and are shown the importance of early diagnosis. The truth of this statement has been seen in those parts of the Country such as Fife, where Midwives are given this instruction.

V.   *Radiographic features at this stage.*

Straight X-ray shows a markedly sloping acetabular bony roof. The osseous nucleus of the femoral head is normally not present until 6 months, but in C.D.H. its development is retarded. Anteversion of the femoral head can be seen—the normally medial oblique direction of the femoral neck being changed to a fore-shortened, vertical position. On medial rotation of the limb the femoral neck once again assumes its correct relationship to the acetabulum.

Subluxation and Dislocation

Although all cases should be diagnosed at the first stage, there are still many instances in which the child is not seen until a year or more of age.

The mother often notices that the child is late in starting to walk, and is resistant to any encouragement. The signs of limited abduction, and assymetrical buttock skin creases, are, if anything, more pronounced, shortening of the leg is usually seen, and the phenomenon of "telescoping". The Trendelenberg test becomes positive as subluxation proceeds. The femoral artery, which in the normal lies immediately anteriorly to the femoral head, and can be felt pulsating, becomes implapable as the head rides up.

Eventually, in neglected cases, the features of gross dislocation are seen— widening of the hips, a marked limp in unilateral cases, and a waddling gait in bilateral cases, with hyperlordosis and a tilted pelvis.

It is when the hip has reached the stage of subluxation, that normal radiological control gives way to arthrographic control, and the latter is essential in order that adequate treatment can be carried out. The vital part that arthrograms play will be demonstrated when I consider treatment, but the essential thing that such a procedure shows, is whether the limbus is being everted by the femoral head, or whether the head has escaped the confines of of the limbus, which has become inverted. The value of arthrography has by no means been universally accepted, partly because not everyone holds the view that the limbus plays such an important role in the treatment, and also partly probably because the technique of arthrography is not too easy, and needs constant practice to become familiar, both with technique, and with the evaluation of results.

Treatment

When considering treatment, I must of necessity, give mainly only a narrow selection of those methods that seem, in the light of present day knowledge and experience, to offer the best chance of success. However, I would like to mention briefly, some of the methods used at earlier times for the aleviation of the disease.

In 1701 Verdue reported a successful reduction of the dislocated femoral head of a cadavre by traction on the thigh. As soon as traction was released

however, redislocation occurred. Dupuytren denied any possibility of cure and deplored any attempt at treatment. In the late 1830's Hymbert and Jacquier used forced instrumental extension and attempted reduction in one sitting on a girl aged eleven—a pretty traumatic procedure. Pravaz attempted a much more gentle manoeuvre—maintaining traction on the thigh for 8-10 months. As soon as the head came down to the level of the acetabulum, he applied exaggerated extension, with abduction, and inward pressure against the greater trochanter. This method, which was a considerable advance, failed mainly because late cases were treated, and maintenance of the reduced position was unsatisfactory.

In 1888, Poggi carried out the first open operation, reducing the head, and fixing it in a surgically deepened socket. Hoffa and Lorenz improved this technique but this treatment, although its advocates claimed successful results, was not generally accepted. The hazards of operation were still too great, and some of the opinions of the results may be gathered from the comment of the contemporary surgeon—"Before operation, Hoffa's patients walk like ducks; after operation, they walk like operated ducks".

It was left to Lorenz to introduce a new concept. At the end of the last century, he suggested conservative treatment, and divided the two objects of treatment into separate, equally important parts—Reduction and Retention. His reduction was achieved at one sitting under general anaesthesia. Retention of the reduced position was held for a specific and prolonged period, exerting a stimulus on the acetabular cartilage during the stage of most extensive growth.

This met with considerable opposition at the time, from the then leading Surgeons, but has since been vindicated, and only recently has any method evolved which is likely to replace it.

In considering present day treatment, I should like to divide the topic into two parts—The Classical procedure as propounded by Lorenz and Hass, together with associated operative procedures, and the modern methods advocated by Mitchell, Scott and Somerville.

Firstly the *Classical Procedures* :

At an early stage, that is in predislocation and early subluxation, Hass recommends simple abduction on an abduction bar, until ossification of the acetabulum is satisfactory.

Late subluxation and dislocation are treated by manipulation under general anaesthesia. Preliminary longitudinal traction is applied to the limb, to attempt to bring the femoral head down, and to stretch the contracted soft tissues. After a fortnight's traction the following manoeuvre is carried out—While an assistant fixes the pelvis, the operator, maintaining longitudinal pull, flexes the thigh to 90 , thereby bringing the femoral head from a posterior and superior position to a position posterior to the acetabulum. The flexed thigh is now swung out into 90 of abduction, so that the femoral head now lies at the posterior rim of the acetabulum. Pressure on the greater trochanter should now push the head over the rim, and into the socket. The hip is now held in this "Frog" position by a hip spica. Hass's variation of Lorenz' original manipulation is to increase flexion to 100-125 , by which means he claims the head fits more deeply in the socket. Retention in this position is necessary for at least a year, after which there is gradual mobilisation. The degree of success of this method over a short period can be quite considerable, but long term results are much poorer, estimates of long term success varying from 60% to

as little as 10%. There are several possible causes for this—(1) Redislocation—due sometimes to the excessive anteversion, which may or may not correct itself spontaneously. Probably more often, redislocation is due to the interposition of the limbus between socket and joint. No doubt in some cases, the limbus atrophies, or the head accommodates itself to the reduced size of socket, but in many instances, redislocation occurs on removal from the spica, or on weight bearing. (2) Osteochondritis of the femoral epiphysis—according to Scott this occurs in about 25% of all cases reduced by this method. This is possibly due either to the force employed in the reduction, or to torsion of the capsular vessels in the "Frog" position. This is, to many people, a serious drawback to the procedure. Other disadvantages are the long time of plaster retention, and apart from the resulting detriment to the child, this imposes problems of nursing, toilet, etc.

There have been several operations devised, mainly for use in the later stages, when secondary changes have taken place, or closed reduction has failed. Lorenz used to gouge out the fat and connective tissue of the socket and, after traction, replace the head. There is obviously no chance of anything like a normal joint developing here.

Various forms of shelf operations are still carried out in many centres to keep the hip stable. Either an extra-articular buttress is constructed, extending beyond the joint margin, or else the slope of the acetabulum is altered by means of an incomplete osteotomy above the joint. This has the disadvantage of altering the contour of the socket, and so altering the internal congruity of the joint, predisposing to degenerative changes. A recent modification of this method has been introduced by Salter. He carries out an innominate osteotomy of the affected side, so that the whole acetabulum is rotated. Thus the joint surfaces are maintained in complete congruity and, by means of wide incision, he is able to reduce the head deep to the limbus. Early, short-term results appear very satisfactory.

Finally, there is the Colonna operation, in which the capsule forms an arthroplasty.

In recent years, there have been attempts to improve on the foregoing classical methods, both as regards final successful results, and also in the length of time necessary for treatment. Out of these endeavours has come a system of treatment that has developed largely due to the efforts of Mitchell in Edinburgh, and Scott and Somerville in Oxford. In most respects, the methods are the same in both places, and it is the Edinburgh procedure that I shall discuss.

At the stage of Primary Instability which will usually be detected soon after birth, treatment is simple. Abduction is maintained by means of about four napkins and, with satisfactory home conditions, maternal supervision with frequent radiological control is satisfactory. A stable hip, with satisfactory acetabular development, has usually come about by the normal age of walking. This prophylaxis is a safer method of treatment than that of "Controlled Observation", advocated by Leffmenu. Even though he claims that the majority of radiologically unstable hips are normal by the age of eight months, there was the small number (5 out of a series of 80) who did not and whose active treatment was thus postponed several months.

Where more abduction is needed in early subluxation the Forrester-Brown Splint is highly satisfactory, and adjustment to it can be carried out on an out-patient basis.

We now come to the point where hospitalisation is needed, the subluxated

and dislocated stages. As I said before, arthrographic control is essential here.

Summary of the Procedure.

An arthrogram is carried out first to discover the position of the limbus. The immediate treatment is similar whether the limbus is everted (i.e. Subluxation) or inverted (i.e. Dislocation). The child is put in the Jones double abduction frame, and longitudinal fixed traction is applied to both lower limbs in the neutral position. The bottom of the bed is elevated to quite a considerble degree, to apply counter-traction. The child is left thus for 10 days —if the head of the femur is pulled down, abduction is started. The preliminary traction is most important, and probably many of the criticisms of the method stem from failure to carry this out efficiently. Abduction proceeds gradually—by one hole, alternate sides, each day. Sometimes, the abductors of the thigh are very tight, and require preliminary tenotomy. In most cases, however, gradual abduction is sufficient to stretch them. When 70° of abduction is obtained, the hip is re-X-rayed, and if cross-pull is required to bring the femoral head down to the socket, a weight varying from ½ - 2 lbs. is applied. This maximum is never exceeded in young children. The frame is then abducted to 90°, and pelvis again X-rayed. Longitudinal traction is loosened, the cot levelled completely, and the head allowed to ride into the socket.

At this stage, the procedure for subluxation and dislocation diverge. If the limbus was only flattened and everted in the original arthrogram, the hip is held in medial rotation to compensate for the anteversion and in slight abduction. Until recently retention in a Batchelor Plaster was practised, in which the abduction was increased to 90°, but this has shown some tendency to cause osteochondritis .

Should the limbus be inverted open removal of it is undertaken and the hip put in a plaster spica. If the degree of anteversion necessitates it, a derotational osteotomy is carried out a month later, and the child again immobilised in plaster spica for a further six weeks. The spica is then removed, hips are X-rayed out of plaster, and below knee traction is applied for a fortnight; The child then starts excersises in the swimming pool and physiotherapy, and is generally mobilised.

It will be seen that the length of treatment is considerably cut down by this method. Redislocation due to persistence of an inverted limbus, or to femoral anteversion, are eliminated. In Scott's series of subluxations treated on the frame up to 1953, he estimated the incidence of osteochondritis as 8%; more recently it has been shown that it is possible to reduce this complication to virtually nil by avoiding the use of the Batchelor Plaster.

One criticism of the method is that if the limbus is removed the child is subjected to several operations—the excision, the derotational osteotomy, and the later removal of the osteotomy plate. In this connection, it is interesting to note that Wilkinson has recently shown that maintenance of normal young rabbits' hips in medial rotation cause increased anteversion, whereas the frog position corrects this. One might suggest, therefore, that maintenance of the frog position after excision of the limbus might save the further osteotomy. However, with the possibility that this position might cause osteochondritis, it would be a rather risky procedure to carry out.

The above procedures have been found sucessful up to the age of six; after this secondary contractures make some such operation as the Salter innominate osteotomy the procedure of choice.

Summary.

In this short paper, I have only touched on a few aspects of the diagnosis and treatment of C.D.H. The methods are many, their protagonists and antagonists legion. Perhaps I may finish by quoting a remark by Oschner at the beginning of this century: "There's still quite a little that remains to be discovered regarding this disease." That has some claim to be the understatement of the century.