possible to make out a swelling and a dull area at the seat of her pain in the left lumbar region, and a skiagram showed a collection of stones. It was evident that an operation was her only chance. Despite her wretched condition it was undertaken. An incision resulted in the removal of a quantity of stones and of a large amount of pus from an enormous loculated abscess. She rallied somewhat and gave hopes of recovery, the pus draining well from the inserted tube, but after a week the struggle proved too much for her enfeebled powers, and she gradually sank and died nine days after the operation.

There was no fair chance for surgery in this case, the patient having delayed too long. The operation was borne fairly well, but there seemed no recovery power, and probably there was very little actual kidney tissue left remaining.

The last case to which I propose to draw attention was one of calculus in the perineum.

CASE V.

The patient, a labouring man aged 33, came under my care in the hospital on April 24th, 1912, with a sinus in the left side of his scrotum, which discharged pus and urine. The left testis was absent, and he had a right scrotal hernia. He had been at work up to the end of 1911, when he had an attack of influenza; and it was only since then that he had noticed discomfort and discharge. A catheter passed into the urethra struck a stone about the position of the triangular ligament; and two days after his admission an incision down to this point was made and the stone removed. It measured $1\frac{3}{4}$ by $1\frac{1}{2}$ in., and must have been forming for a long time. It was very firmly impacted in the perineum under the pubic arch, and projecting into the urethra, and thus blocked it. The septic condition of his scrotum prevented me from examining the bladder lest it should be tainted by the catheter or sound. During his convalescence from the operation the sphincter of the bladder worked perfectly, the patient passing water like a woman, until the wound had granulated and healed up; he recovered without the recurrence of any cystitis.

This, therefore, was an extravasical stone when extracted, but had its origin in the kidney or bladder, whence it had travelled into the urethra, and there ulcerated through the mucous membrane, and gradually grew into the perineum along the lines of least resistance to its present size. The patient did all the work of a labourer on the land until shortly before the operation, but never rode a bicycle.

The x rays proved a very valuable help in the diagnosis of these cases, as also in their operative treatment; and I am grateful to Dr. Scales for his co-operation, especially for the picture of the large pelvic stone in the young female.

TREATMENT OF CONGENITAL DISLOCATION OF THE HIP.

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[WITH SPECIAL PLATE.]

SINCE Lorenz, in 1895, first introduced his operation of "bloodless reduction" of congenital dislocation of the hip, treatment of this affection has become well established in orthopaedic practice, and it is attended, in the majority of cases, with the happiest results.

Many surgeons, however, have not made themselves acquainted with the progress of this branch of surgery during the last eighteen years, and even now one hears the old objection that in congenital dislocation treatment is useless, and that the acetabulum is absent, or at least so small that the head of the femur cannot be placed therein. But orthopaedic surgeons know that an acetabulum of some sort is always present, except in some old untreated cases in which, in the course of years, it becomes obliterated; and the argument that it is too small is a relic of obsolete pathology, for, however rudimentary it may be, it is still sufficient. It is many years since we were taught to believe that bone is a rigid, unalterable structure. We know now that bone, like other tissues, is capable of undergoing plastic changes in obedience to forces acting upon it; an angular deformity in fracture becomes buttressed by new bone on one side and rounded off on the other; the bones of the foot become changed in shape, both in the development and in the cure of deformities; similar

changes occur in the spine, the chest, in fact in any part of the skeleton. It is proved beyond question that in congenital dislocation of the hip, if the head of the femur is placed and retained "in," "on," or "against" the acetabulum, the bone grows out around the head, the acetabulum becomes deeper and the head better developed, so that a joint is formed which is anatomically and functionally sound.

The majority of surgeons who deal with these cases have adhered more or less closely to the technique described by Lorenz; indeed, many still follow his original teaching in every detail. But it must not be supposed that the surgery of congenital hip has stood still for eighteen years. Many modifications have been introduced during that time—some good, and some bad—and, while the general principle of Lorenz's pioneer work remains the same, there is no doubt that just as good results—and in many cases, I am convinced, much better results—can be obtained by a technique which differs in many ways from the original.

I do not propose to describe the details of Lorenz's procedure here, but some criticisms of the method must be made.

I.

As every one knows, the first step in Lorenz's "bloodless" operation is to stretch or tear the soft parts around the joint; the adductor muscles are ruptured by forcible abduction and hacking with the hand; the parts behind and in front are stretched by forced flexion and hyperextension, and those above by traction on the limb. It is taken as an axiom that the hip cannot be properly reduced until all the soft parts are so stretched as to offer no resistance. This is not true; for in the majority of cases the hip can be reduced without any of these violent preliminaries, which are responsible for most of the shock and for nearly all the accidents of the Lorenz operation, and which, in addition, greatly weaken the muscles of the thigh.

The constant pull of the muscles upon the femur is the most important factor in bringing about the development of the joint, and, provided that the head of the bone is in place, the more powerful the muscular retraction the better. The muscles should therefore be damaged as little as possible.

II.

Many surgeons do a preliminary tenotomy, sometimes an extensive division, or even partial excision, of the adductors, in order to facilitate stretching. This, I am convinced, is a great mistake. I have seen a number of cases in which there was a wide gap where the adductors had been divided. Some of these cases had been successfully reduced and had good hip-joints, and yet they walked very badly. The disability in many of these cases is, I believe, due to permanent weakness of the adductor muscles, the gait being comparable in every way to what is often seen in cases of infantile paralysis when the adductors are affected, and the child, to compensate for the weakness, throws himself on to the head of the femur at each step, so that he sways from side to side. Simple tenotomy of the adductor longus is sometimes necessary in old and resistant cases; as a routine it is to be condemned. When a congenital hip is reduced and fully abducted, some muscles are bound to give way, but the damage should be limited to this, and unnecessary interference avoided.

III.

In the earlier attempts to treat congenital hip, the great difficulty was the tendency to redislocation of the head of the femur backwards. To overcome this, Lorenz introduced his "frog" position, in which the thigh is fixed in right-angled abduction and external rotation, the knee being actually behind the plane of the hips, and this position is still used in the majority of cases immediately after the hip has been reduced.

But the fear of reluxation has been exaggerated. In the Lorenz position the head of the femur is thrust forwards and tends to project in front; often it passes in front of the acetabulum, and an anterior transposition is the result. Anterior transpositions are so common after the Lorenz technique that some surgeons have even counted them among their "successful" results! It is

true that, compared to an untreated dislocation, the functional result of anterior transposition is often very good, but it cannot for a moment be compared with that of true reposition. The head should be placed in the acetabulum, and nothing short of that can be called a success.

When the Lorenz position is maintained too long, the retraction of the soft parts behind is so great that the thigh cannot be rotated inwards. Consequently after this treatment one sees many cases of persistent external rotation (often associated with anterior transposition), which gives rise to great disability, and is most difficult to treat. The Lorenz position should be employed until the tendency to backward displacement is overcome—that is, a comparatively short time—after which the thigh should be placed in a position of *internal rotation*, which gives a much more perfect apposition of the head of the femur and acetabulum, and which also allows retraction to take place more equally all round the joint.

IV.

When the hip is successfully reduced, there is considerable tension on the muscles of the thigh, especially on the hamstrings, which keep the knee tightly flexed. Great stress is laid by Lorenz and his followers upon the stretching of these muscles by daily extension of the knee soon after reduction. I believe this to be absolutely wrong. The surest way to induce redislocation of the hip is to stretch the hamstrings early by extension of the knee. The force of such stretching acts obliquely upwards on the femur, and if there is any possibility of the head slipping sideways from the acetabulum, it will be made to do so. The fear of permanent flexion of the knee is unfounded. Personally I make a point of including the knees, flexed, in the first plasters, so as to ensure that they are left alone. I have had them fixed in this position for upwards of eight months, and I have never had any trouble in getting them straight afterwards. In the second position of the hip it is necessary to include the knee in order to secure internal rotation.

V.

Another fallacy of the Lorenz after-treatment is the alleged importance of "grinding" movements of the head of the femur in the making of a new acetabulum. To this end the child is encouraged actively to use the limb within the restrictions imposed by the plaster. The knee being left out, some rotation of the femur is possible, and it is a common practice to put the child astride on a low chair or hobby-horse, and to let her push herself about with a leg on each side; then she is taught to walk, and the activity such patients display in their plasters is often surprising. All this, as I have said, is to encourage "grinding" of the joint. It is thought that the grinding or boring motion of the head of the femur is a most important factor in deepening the acetabulum and in promoting the formation of new bone around it.

I believe this is a notion derived from a false analogy. We know that in certain fractures which fail to unite, constant movement is a factor in preventing repair; and that when a false joint forms the opposed ends of the bone become smooth, rounded, and to some extent mutually adapted by friction and pressure; friction, too, is mainly responsible for the development of a false capsule to the joint. But in congenital dislocation of the hip totally different conditions obtain. The head of the femur and the acetabulum are both covered by cartilage, and all the elements of a joint are present. The aim of treatment is to secure *stability*. The changes in the bones are brought about, not by friction, but by constant unchanging *pressure*. The source of this pressure is the pull of the thigh muscles upon the femur, and this pull is constantly acting when the head of the bone is in place. Under the influence of this force, if the limb is left absolutely undisturbed, the acetabulum can be seen (by *x* rays) to become deeper, the head of the femur is better developed, and a buttress of new bone grows up from the margin of the acetabulum around the head until a secure joint is formed (Fig. 2). Then, and not till then, should the child be allowed to use the limb. Activity before this stage can only make for instability. By movement the pressure is distributed over a wider area, instead of being concentrated on the centre of the joint; the acetabulum becomes wide

and shelving instead of steep and abrupt; the capsule is looser all round than if the joint had been kept still, and, lastly, movement is a potent cause of redislocation.

VI.

Ultimately, when the plaster is removed and the child is allowed full freedom, she rapidly regains her strength and normal use of the limb, *provided that the hip has been properly reduced*. I have never found it necessary to order special exercises, massage, or manipulations to strengthen the muscles or to obtain movement in these cases. Children do not waste to a skeleton through mere inactivity. In cases of tuberculous disease of the spine or hip we see children immobilized, sometimes for years at a time, and yet, as soon as they get about, they pick up all they have lost. During recumbency they are for the most part plump, and merely "out of condition" in the athletic sense. In congenital dislocation of the hip persistent weakness after reduction is due to gross injury of muscles; restricted movement is due to faulty reduction.

The Reduction of Congenital Dislocation of the Hip.

By far the best method with which I am acquainted is that of reduction over the *inferior* border of the acetabulum, advocated by Ridlon. It is performed in the following way: In the case of a left hip the knee is grasped with the right hand, and the limb is fully flexed both at the hip and the knee; the head of the femur is thus directed downwards. Pressure—and, if necessary, great pressure—is now made straight downwards upon the knee, so that the head of the femur is driven down below the acetabulum; counter-pressure is made by the other hand upon the tuberosity of the ischium, and the position of the femoral head is made out by the fingers of that hand feeling in the buttock. The descent of the head is increased by internal rotation of the thigh, but, as Ridlon has pointed out, it may even descend too low for easy reduction. When the head has thus been brought below the acetabulum, the thigh is slowly abducted; the head then passes upwards over the lowest part of the rim into the acetabulum.

The simplicity, rapidity, and ease of this reduction, as compared with the Lorenz method, is often surprising. In the latter, the hip is reduced over the *posterior* margin of the acetabulum, with the thigh abducted to a right angle. To do this successfully, the head of the femur must first be brought down to that level by tearing and stretching the soft parts. But in reduction over the inferior border no preliminary violence is employed; the limb is not previously pulled about in any way; descent of the head is secured by the position of the limb and by direct pressure downwards on the femur; when the thigh is abducted the muscles aid rather than oppose reduction.

The elimination of unnecessary violence is a great advance in the treatment of congenital hip. Shock is infinitely less; the risk of accident—fracture, paralysis, etc.—is reduced to a minimum; permanent weakness of the muscles is avoided, and their important action during after-treatment is better preserved.

One other advantage must be specially mentioned. In the treatment of congenital hip it is generally agreed that there is an age limit beyond which it is inadvisable to attempt reduction—usually about eight years in bilateral, and about ten years in unilateral, cases. This restriction is imposed on the Lorenz operation on account of the great violence required to stretch the soft parts in older patients, whereby the severity of the operation is proportionally increased, and the risks of serious accidents are very much greater. But, as I have already said, in reduction over the inferior border, these preliminary forcible manipulations are avoided, so that the same objections do not apply to this method. Accordingly, the scope of the operation has been considerably extended in recent years, and many older patients are treated now than formerly. It is not to be denied that the difficulties increase with age, but provided that they can be overcome, there is *no age limit*, as such, to reduction of congenital dislocation of the hip. The limit is reached, in an individual case, when the operator ultimately fails to get the hip in. I have emphasized this point because many surgeons maintain that it is unjustifiable to attempt reduction over a certain age. Many patients are, therefore, passed over who at the present day certainly ought to be

given a chance. The ideal of treatment is to benefit the greatest possible number of patients, and if there is any possibility of getting a hip in without serious injury to the patient, it should be attempted. It may be said in passing that the age of a patient is not always a sure guide to the difficulty of reduction; a case of 14 or 15 may prove to be easier than one of 4 years old; often in bilateral cases one side is much more difficult than the other; some of the most difficult cases are in quite young children.

Treatment after Reduction.

As soon as the hip is reduced it is put up in plaster-of-Paris while the child is still under the anaesthetic. At this stage the Lorenz position—that is, abduction to a right angle and external rotation—is adopted, but it should be seen that the head of the femur is not displaced too far forwards. Both sides should be put up, even when the dislocation is unilateral; though in the latter case the sound hip need not be forced into full abduction, but should be put into as nearly a symmetrical position as it will go. A unilateral plaster is unsatisfactory, as it does not fix the hip properly. Also, I always make a point of including the knees in the plaster, so that no stretching of the hamstrings is possible.

Skiagrams should be taken before and throughout the treatment, and the position of the head of the femur should be checked by them. The position is often spoken of as being "good," "fair," or "nearly in." But there are no degrees in reduction of congenital hip—the hip is either in or it is out. If it is in, well and good; if it is out, the plaster must be cut off and one must begin again by reducing it.

One is often asked how long the first plaster should be left on, but it is impossible to give a fixed time for all cases. It is determined in each case by the conditions found at operation and after. In an average case, where there is fair stability on reduction, it is left on for three or four months, and at the end of that time the hip is examined, and according to the degree of stability present it is decided whether to change the position or not. The hip should never be allowed to redislocate in order to estimate its stability. Cases which are very difficult to reduce, and also cases which are very easy, as a rule require longer fixation than others. Often the more easily a hip slips in the more easily will it slip out and the longer will be the time required to make it firm. In some very mobile cases—especially in some which had been unnecessarily stretched—I found that the only way to prevent redislocation was to keep the hip in the first position for a year. On the other hand, it must be remembered that fixation for too long a time in one position may give rise to difficulty later. The time must be separately determined, not only for each case, but, in bilateral cases, for each hip.

When sufficient retraction has occurred in the soft parts behind the hip, the position of the limb should be changed.

The second position is one of slightly diminished abduction with about 45 degrees of *internal rotation*. This brings the centre of the head of the femur into more perfect apposition to the acetabulum; it removes the tendency to anterior transposition; and it allows a more equal retraction of the soft parts around the joint. An anaesthetic is necessary for this change, and the position is secured by a plaster which again includes the knee, flexed. In a bilateral case each hip is treated according to its own indications; so that either the position may be symmetrical, or one hip may be in the second position while the other is still in the first. In a unilateral case the sound thigh is brought down straight, and the upper part of it is included in the plaster.

This plaster is left on as a rule for four or five months, after which a fresh one is put on in still further diminished abduction, and this time leaving the knee out. In a unilateral case, only the affected side need now be put up. If there is any contraction of the knee it is soon overcome; and then, provided that the hip is firm, the child is allowed to walk, the sole of the boot on the affected side being raised about 2 in. to keep the limb abducted. In a bilateral case if one side is more advanced than the other, it must wait until both are ready for the child to walk, and of course no raising of the boot is necessary.

When I first adopted fixation of the knee in the plaster

I expected that some contraction of the hamstrings would follow, and I was surprised, on cutting off a plaster after eight months' continual flexion, to find that the knee could be straightened at once without any force. This I have since found to be common, and when slight contraction does occur it is always easily worked out in a few days by ordinary manipulations. I have never had any difficulty in getting the knees straight, and as I believe that it is important to leave the muscles alone until the hip is firm, I never have any hesitation in fixing the knees during the earlier stages of the treatment.

The last stage of the treatment consists in gradually reducing the amount of abduction and in deciding when to allow the child to go free. The skiagrams should now be showing a well-marked formation of new bone above the acetabulum, the cavity of which is better developed, as is also the head of the femur. These changes indicate that redislocation will not take place, and the child may safely be allowed to go without plaster. The last remnant of abduction is left for the child to get rid of, and, if a good joint has been formed, she quickly does this, and in addition recovers full use of the hip.

Naturally, plastic changes occur more readily in the growing bones of young children than in the denser, more mature bones of older patients. The fact that reduction may be attempted at a later age in *neglected cases* must not be taken to mean that treatment may safely be deferred while the child is young. To obtain the best results congenital dislocation of the hip must be treated in *early childhood* while the growing bones are soft and readily adaptable. Only in neglected cases does the question of late treatment arise, and in these cases it is determined by (1) the possibility of getting the hip "in," and (2) the probability of a stable joint forming within a reasonable time.

It has been shown that, if time is no object, bone changes similar to those which occur in children may be brought about, even in adults, by a constantly acting force. Thus in the old days of exclusively instrumental treatment of deformities, extreme cases of genu valgum, etc., were *cured* by apparatus which was worn sometimes for any period up to fifteen or twenty years. Such slow progress is not tolerated at the present day, and, of course, it is out of the question in the case of congenital hip, where the patient cannot get about until the joint is firm. The example merely serves to show that plastic changes can be brought about in a mature skeleton, though much more slowly. In late cases of congenital dislocation of the hip the question is whether sufficient stability can be secured within a reasonable time. If there is a fairly good acetabulum and fair stability on reduction the ordinary routine treatment may be successful, but failing this the only alternative is an open operation to make an acetabulum—that is, by cutting it out. The open operation has given good results in a number of selected cases, but it is exceptional treatment to be reserved for old cases, and its performance as a routine in young children is to be absolutely condemned. The best results in congenital dislocation of the hip are obtained by manipulative reduction in early childhood, and they are incomparably superior to those obtainable by any other method of treatment.

In a speech recently delivered at the general meeting of the Society of Preservation against Tuberculosis, the French Minister of the Interior supplied the following figures as to tuberculosis which he said no one could dispute. Of the total number of deaths in France a proportion of 12.07 per cent. is due to definitely recognized tuberculosis, a figure higher than that of all other diseases. The proportion is higher in France than anywhere else. Moreover, during a period of three years 217 deaths per 100,000 inhabitants have been recorded, as compared with 139 deaths in Belgium, 166 in Italy, 146 in England, and 168 in Germany. The evil appears still more serious when it is considered that it is especially in persons between the ages of 20 and 40 that tuberculosis is particularly frequent. Of 100 French men and women who die at that age, 42 die of tuberculosis. In Paris the mortality from tuberculosis in 1909 was 44 per 10,000 inhabitants. The proportion was 33 for the department of the Seine, 30 for the Seine Inférieure, 27 in the Cotes-du-Nord, 26 in the Finistère, L'Ille et Vilaine, Loire Inférieure, and the Rhone. In the Hautes Alpes it fell to 10.

CONGENITAL DISLOCATION OF THE HIP (MR. A. S. B. BANKART).

FIG. 1.—Congenital Dislocation of Left Hip. Boy aged 3½ years. Before treatment. B, Upper epiphysis of femur. (Skiagram by Dr. Stanley Melville.)

FIG. 2.—Congenital Dislocation of Left Hip. Same case as Fig. 1, ten months after reduction. A, Buttress of new bone at upper margin of acetabulum. B, Upper epiphysis of femur.