The anterior ligament is also very strong, being nearly one-fourth of an inch thick (4 to 5 mm.), and the longest strengthening band of the capsule. It assists the superior ligament in limiting extension, but not in the same plane, the plane of limitation for the superior ligament being nearly parallel to the axis of the femoral neck, that of the anterior with the axis of the shaft.

The two ligaments are but slightly developed before the erect position is attained. Indications of them are found early, but they increase with the growth. In animals that can stand partially erect, such as apes and some marsupials (kangaroo), the ligaments are strong; in others slight.[13]

They have an important influence in determining the deformity which results from dislocations of the femur, and may be used as a fulcrum in reducing them.[14] Thus, it is the superior ligament which holds the neck fixed, and hence causes the inward turning of the toes in dislocation backward. In thyroid dislocation the anterior ligament causes in a similar way an eversion of the toes.

Another strengthening band of the capsule is the pubo-femoral ligament, which stretches from the pectineal eminence of the pubic bone to the lesser trochanter. It is from 2 to 3 mm. thick, and limits abduction. The ischio-femoral band is of about the same size, and stretches in a similar way from the tuberosity of the ischium to the digital fossa of the great trochanter, along the line of the tendon of the obturator internus, with which it is somewhat blended. It limits rotation inward. It is sometimes described as ending upon the capsule, and therefore called ischio-capsular (Henle); but Welcker and others find the arrangement described the usual one.

The action of these four bands is such that in passing from the flexed to the extended position they wind around the neck in such a way as to shorten the capsule, which, being closely united with the zona orbicularis, is drawn up against the edge of the acetabular cavity and surrounds the lower part of the head as with a ring. It may be said that the contraction is such that dislocation is impossible in the extended position.

The brothers Weber made the discovery that the head of the femur is held in position by atmospheric pressure, the amount of weight thus lifted being somewhat greater than that of the limb. This greatly economizes the muscular force required for walking. The closely fitting cotyloid ligament assists this greatly, and dislocation is very unusual, if not entirely impossible, without injury to it. Men and animals that ascend mountains to a height where the air becomes sufficiently rarefied to be of less effect in upholding the weight of the limbs suffer from weakness in the joints. Hyrtl[9] states also that mountaineers, who have trained their muscles by long use in a rarefied atmosphere, are somewhat inexpert in the use of their legs when they descend to the valleys.

The arterial supply to the joint is, as has been stated, through the notch in the lower part of the acetabulum, some collateral circulation being imperfectly effected by means of capillary branches from the nutrient artery of the femur. The capsular ligament is remarkable for the number of vessels and nerves which ramify in it.

The joint is usually said to be supplied with nerves from the sciatic and from the obturator trunks, but recently the nervous supply has been carefully reinvestigated by Chandelux, who finds it to be as follows: In front, a twig from the musculo-cutaneous branch of the anterior crural is given off a short distance from the point where the nerve is lost in the pectineus. This passes behind the sheath of the femoral vessels, and reaches the capsule at its antero-internal portion. It supplies the internal half of the anterior part of the capsule. Behind there is a branch of somewhat variable origin, but always emanating either directly or indirectly from the sacral plexus. It descends upon the posterior part of the articulation, reaches the capsule behind and above, and is distributed to the internal half of the posterior portion. No nerve was found from the obturator trunk.

It is believed that this distribution explains certain phenomena connected with coxalgia. In certain forms the propulsion of the head against the acetabular cavity by percussion upon the knee is hardly felt, although a direct pressure upon the internal part of the femoral head in front is very painful, as are also forced movements of outward rotation. In this case it is supposed that there is a coxalgia of capsular origin.

Again, the characteristic attitude is also explained. Often adduction of the leg is accompanied by inward rotation, but in some patients outward rotation occurs. As the anterior articular nerve is only a bifurcation of the branch going to supply the pectineus, it may easily be imagined that a neuritis, arising perhaps from the synovial membrane, affects the pectineal branch and causes the muscle to act.

The pain in the knee, which is an almost constant symptom in hip disease, has usually been considered to be caused by the reflex action through the articular branch from the obturator nerve. It may, however, be caused by a neuritis extending to the internal saphenous nerve, or, as is more likely, by the pressure which the effusion into the joint makes upon the obturator nerve where it lies upon the anterior part of the capsule.[8]

Frank Baker.

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HIP-JOINT, CONGENITAL DISLOCATION OF THE.—Congenital dislocation of the hip-joint, or perhaps more properly misplacement, is by far the most common and the most important of this class of disability.

It is much more common in females than in males, as is illustrated by the following statistics: In 671 cases collected from different sources by Lorenz 589 (87.8 per cent.) were in females and 82 (12.2 per cent.) in males. Of 1,039 cases seen at the Polyclinic in Milan, 867 (83.4 per cent.) were in females, 172 (16.6 per cent.) in males. In 500 cases recorded at the Hospital for Ruptured and Crippled, 413 (82.6 per cent.) were in females and 87 (17.47 per cent.) in males.

The dislocation is more often unilateral than bilateral. In Lorenz's series of 671 cases, 421 (64.4 per cent.) were single; 225 of the right, 196 of the left side. In 245 cases (36.6 per cent.) the displacement was bilateral. In the statistics of the Hospital for Ruptured and Crippled 353 (71.3 per cent.) were unilateral; 135 of the right and 218 of the left side; 136 (27.87 per cent.) were bilateral.

The dislocation at the time when the patients are brought for treatment is usually posterior, upon the dorsum of the ilium. In other instances it is anterior, the head of the bone lying below the anterior superior spine. Occasionally the displacement appears to be a subluxation due to laxity of the capsule; in such cases it may be directly upward, supracotyloid. This form is more often seen in infancy, and it represents possibly the primary displacement of a much larger proportion of the total number, which changes to the ordinary form under functional use.

Pathology.—The degree of abnormality of the joint and of the surrounding parts varies with the age of the patient and with the strain and friction to which the displaced parts have been subjected. At birth it may be assumed that the head of the bone lies in close proximity to a somewhat rudimentary actetabulum. At a later time, when the joint is exposed at operation at the age of four years or more, the rudimentary acetabulum may be partly filled with cartilage, fat, and fibrous tissue. As a rule, however, a well-marked ridge indicating its posterior and upper margin can be made out and in many instances it appears to be of fair size and depth, but always misshaped to a greater or less degree, smaller and shallower than normal, and in older subjects contracted at its upper margin to a somewhat triangular form.

The capsule is elongated to accommodate the upward dislocation of the femur. It is hypertrophied, especially where it covers the upper part of the head of the bone, and it is often drawn into a shape like an hourglass; the upper part contains the head of the bone; the anterior wall is drawn tightly across the acetabulum, forming at its upper border a narrow, slit-like communication, through which the ligamentum teres passes, if it be present. The interior of the capsule is in part lined with synovial membrane, and it often contains more synovial fluid than is found in the normal joint.

The ligamentum teres, although probably present at birth in a large proportion of the cases, becomes attenuated and ribbon-like with the increasing elongation of the capsule, and after the age of five years it is usually absent or very rudimentary.

A shallow depression formed in part by the direct pressure of the head of the bone through the adherent capsule, and in part the result of irritation of the periosteum is usually found upon the ilium, but as it is not often of sufficient depth to assure a secure support for the head of the femur its upper margin gradually recedes or two distinct depressions may be formed one above the other. The upper extremity of the femur is usually somewhat atrophied. The neck is often shorter than normal, its angle may be lessened and in many instances its forward inclination is increased (anteversion). The head of the bone may be nearly normal, although usually it is somewhat flattened on its inner and under surface, or it may be somewhat conical, or again compressed from side to side to an almond shape or otherwise distorted.

There are also secondary changes in the bones of the pelvis. In unilateral dislocation the pelvis is usually somewhat atrophied on the affected side, and a lateral inclination of the spine may be present. The final changes in the pelvis caused by the bilateral dislocation are more important; its inclination is increased, the lumbar lordosis is exaggerated, the sacrum is forced forward and downward so that the antero-posterior diameter is lessened; the tuberosities of the ischia are everted and the transverse diameter of the pelvic outlet is increased.

The long muscles of the thigh are shortened, while those attached about the trochanter are changed in direction and are usually lengthened. There is also a slight general muscular atrophy that is particularly marked on the gluteal group. The changes become more marked with increasing age, and in some of the adult specimens but little resemblance to the normal parts remains.

As a rule, congenital dislocation of the hip is not accompanied by defective development or deformity elsewhere; although cases are sometimes seen in which a general laxity of ligaments is present or in which the dislocation may be one of a series of deformities and malformations.

Etiology.—Nothing positive is known of the etiology of the dislocation. In a small proportion of the unilateral cases it may be due to violence at birth, but the fact that nearly eighty-five per cent. of the patients are females indicates that the primary cause can be neither injury nor disease.

Hereditary influence can be established in a few instances and the displacement may be present in more than one of the same family. The writer has examined three female children, in a family of nine, in each of whom there was dislocation of the left hip, the order being the third, eighth, and ninth child; also twins, one having single and the other double dislocation. In but two instances in a large number of observations, was it certain that congenital displacement was present in the mothers of the patients.

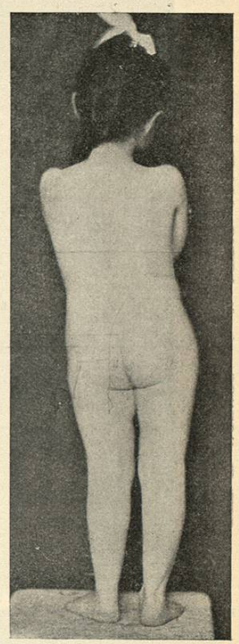

Fig. 2648.—Unilateral Dislocation Showing the Inclination of the Body Toward the Shorter Limb.

Of the various theories that have been advanced to account for the condition, the most reasonable seems to be defective development either of the entire acetabulum or of its posterior margin. This defective development may be primary or it may be secondary to a fixed position of the limb in adduction and flexion.

Heusner has endeavored to explain the greater liability of females to the dislocation by disproportionate laxity of the capsule which he thinks is characteristic of the sex. It is probable that the dislocation in many instances is at birth a subluxation only and becomes complete through muscular action and by the use of the limb in standing and walking.

Symptoms.—The displacement does not as a rule attract attention until the child begins to walk; although in some cases the mother may have noticed a peculiar breadth of pelvis, or a "lump" on the buttock, or a "snapping" about the hip-joint, or a peculiar attitude of the limb before this time.

Unilateral Dislocation.—If the displacement is of one side, a limp is immediately apparent, and this becomes more noticeable as the child grows older. The limp is characteristic of the affection, for the limb is not only shorter than its fellow but owing to the elasticity of the capsule it becomes still shorter when weight falls upon it. Thus in walking there is a peculiar lunge of the body toward the affected side. In most instances the dislocation is upon the dorsum of the ilium, the head of the femur being displaced upward and backward. In compensation the pelvis is tilted toward the short leg and its inclination is increased. It is also rotated forward so that the anterior superior spine lies on a lower plane, and in advance of that of the opposite side.

When the child begins to walk the shortening of the limb is from one-half to three-quarters of an inch. In adolescence it is from one and a half to three inches or

even more, the shortening increasing as the capsule elongates under pressure.

Other signs are the flattening of the buttock and the elevated and prominent trochanter which may be seen

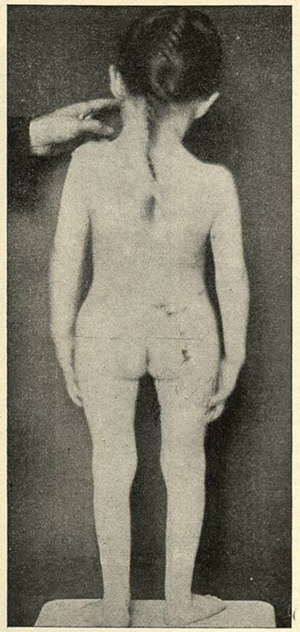

FIG. 2649.—Bilateral Dislocation Showing the Relative Shortening of the Lower Limbs and the Apparent Broadening of the Pelvis.

or felt as an abnormal lateral projection, on a level with the anterior superior spine, which is, as has been stated, somewhat tilted downward.

In childhood the attitude of the limb is practically normal and motion is unrestricted. There is, in fact, an abnormal mobility that may be demonstrated by alternate traction and upward pressure on the limb. As the femur becomes larger and the upward displacement increases, the mobility is restricted; the range of abduction in particular is much diminished and not infrequently the limb becomes permanently adducted and flexed, thus adding the apparent shortening of adduction to that caused by the dislocation.

Bilateral Dislocation.—When the dislocation is bilateral the shortening of the limbs is, as a rule, equal or nearly so, and as both femora are displaced backward the pelvis is tilted forward. In compensation the hollow of the back is increased, the abdomen protrudes, the buttocks are flattened, the pelvis appears to be abnormally wide, and the thighs are separated by a considerable interval. The limp characteristic of the single displacement is replaced by an exaggerated waddle, a "sailor gait."

In early childhood there may be no symptoms other than the physical signs that have been described, but as the child becomes more active it usually complains of discomfort after exertion. It is easily fatigued and at times it may suffer actual pain. These symptoms are of course more marked in the double than in the single displacement, because in the latter case the normal joint is capable of bearing more than its share of the strain. The symptoms often increase during adolescence, but they may become less troublesome in adult life if a permanent resting-place on the pelvis is secured. This security is often assured, however, by a corresponding limitation of the range of motion. The physical signs of course persist and the individual is, as compared with the normal standard, more or less disabled and deformed. Fortunately the great majority of the patients are females, and because of the less laborious occupations and the distinctive dress, the disability and its effects are less serious than if the displacement were more equally divided between the sexes.

The symptoms of the anterior dislocation in which the head of the bone lies beneath the anterior superior spine, are less marked because the relation of the pelvis to the femur is nearly normal, so that secondary deformity is slight. The shortening is less and the resistance of the tissues attached to the anterior superior spine is sufficient to assure a more secure support than in the ordinary form so that the limp is less noticeable. In bilateral anterior dislocation there is a swaying backward of the body, but the exaggerated lordosis is absent.

DIAGNOSIS.—The diagnosis offers no difficulty. The history of the limp, at once apparent when the child began to walk, yet not accompanied by pain or preceded by injury or disease, is in itself sufficiently distinctive. If the displacement is of one side measurement demonstrates the shortening as compared with the other limb, a shortening that is explained by the prominence and the elevation of the trochanter above Nélaton's line. Traction and upward pressure on the leg will demonstrate the abnormal mobility of the displaced head; and finally if the thigh be flexed and adducted to its extreme limit, the neck and head of the femur can be easily distinguished moving under the gluteal muscles when the limb is rotated. Thus it may be differentiated from depression of the neck of the femur (coxa vara), in which although the trochanter is elevated, the neck and head of the bone cannot be felt, and in which the abnormal mobility, characteristic of the dislocation, is absent. Again, coxa vara is almost never a congenital affection, therefore the history itself would practically exclude it.

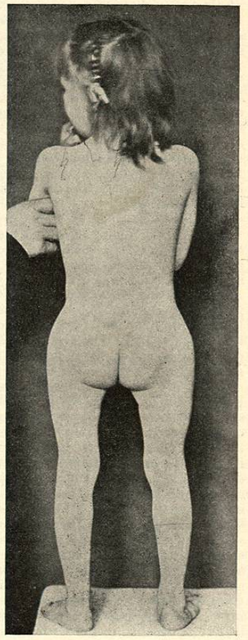

FIG. 2650.—Bilateral Dislocation Showing the Separation of the Thighs.

Upward displacement of the femur not infrequently follows infectious epiphysitis in infancy or early childhood. In such cases a part of the upper extremity of the bone is usually destroyed so that the head cannot be distinguished on palpation. Although the other physical signs are similar to those of the congenital displacement, the scars about the joint show the evidence of former disease and the history is almost always available for diagnosis, so that as a rule such disabilities as well as traumatic dislocations or other results of injury or disease are readily excluded.

FIG. 2651.—Bilateral Dislocation Showing Habitual Flexion of the Thighs and the Increased Inclination of the Pelvis.

Certain of the minor symptoms of congenital dislocation may be simulated by other affections, but these may be excluded readily by the physical examination.

In doubtful cases a Roentgen picture will demonstrate the character of the disability.

TREATMENT. — The principles of the treatment are simple, since it is evident that the only cure of a dislocation must be replacement of the displaced part. The application of these principles is difficult, however, because of the congenital or acquired abnormalities that may interfere with reduction or with the functional ability of the limb after treatment.

There are two methods of treatment by which cure or palliation may be attained. The first is forcible reduction without cutting, of which the most practicable method is that advocated by Lorenz, although this treatment was first advocated by Paci.

The Lorenz treatment is based upon the theory that if parts about the joint can be sufficiently stretched to allow the head of the bone to be brought into direct contact with the rudimentary acetabulum, and if it can be held for a sufficient time in this position, the weight of the body in walking, constantly forcing the bone against the substance that partly fills it, will gradually enlarge it to its normal capacity. Thus he calls it the "functional weighting" method, and this is its essential and vital distinction from the forcible correction of Paci, with which it is often confounded.

The steps of the operation are: 1. Elongation of the Limb. The trochanter must be brought down to the level of Nélaton's line or lower. This may be accomplished by preliminary traction in bed with heavy weights or by manual force at the time of operation, the latter means being efficient in young subjects. The child having been anæsthetized, a folded sheet is passed between the legs, the two ends of which are held by the assistant above the shoulder of the side to be operated on, or the assistant may clasp his hands about the perineum and thus fix the pelvis. In most instances counter-traction on the sheet by one assistant and fixation of the pelvis by another will be necessary. One then seizes the thigh and begins a series of alternate stretchings and relaxations, using gradually increasing force for from ten to twenty minutes, or until the resistance of the tissues is entirely overcome. The leg is then as long or longer than its fellow and lies limp in an attitude of abduction.

For this preliminary extension Lorenz often uses a powerful machine attached to the leg by means of a band about the ankle, but I am inclined to think that the manual method is to be preferred if one does not object to the labor that it involves.

2. Reposition. One now attempts to force the head of the femur over the ridge that represents the posterior margin of the acetabulum and through the opening in the contracted capsule.

The thigh is flexed to about ninety degrees in order to relax the capsule, and while the pelvis is fixed by an assistant, the limb is gradually and forcibly abducted; the resistance of the muscles being overcome by forcibly kneading the tense adductors with the ulnar border of the hand, as well as by the direct traction. During this manœuvre reduction often takes place, but in most instances this is facilitated by upward traction of the flexed limb with one hand, direct pressure being exerted on the trochanter with the thumb of the other hand. The limb is at the same time abducted, and the head of the bone is drawn and lifted over the posterior rim of the acetabulum. This partial reduction is accompanied as a rule by a distinct thud and shock, the limb remaining fixed; a position from which it may easily be displaced by reducing the abduction or flexion.

One now endeavors to make the reduction more stable by enlarging the capacity of the articulation. The forcible abduction is continued, the limb being forced outward until it is parallel with the table, or even behind the plane of the body. It is then forcibly rotated outward and inward. Finally, the patient is turned upon the sound side and the limb is moved up and down (like a pump handle), while strong pressure is exerted on the

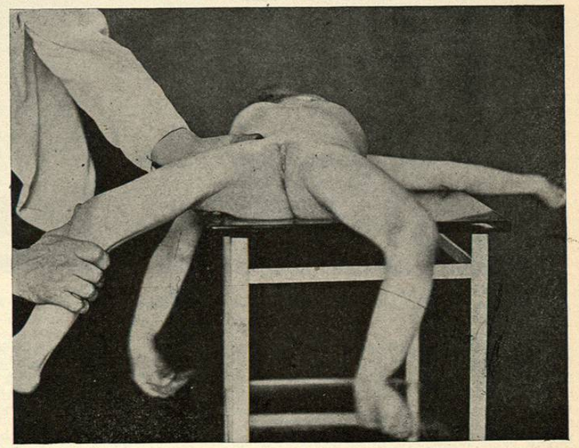

FIG. 2652.—The Typical Position in which to Fix the Limb After Reduction.

trochanter, the aim being to drive the head of the bone forward and inward completely within the capsule and to stretch its anterior wall which was drawn over, and was partly adherent to the acetabulum. The next step is to fix the limb in a position in which reluxation is impossible, the typical position being that already described of over-abduction from the original attitude of right-angled flexion of the thigh on the body. This position Lorenz describes as one of extreme abduction, extension and outward rotation, a description which is somewhat less intelligible to most readers than that adopted. In this attitude the head of the bone should be felt directly under the femoral artery, and it often forms a distinct prominence beneath Poupart's ligament. A short plaster spica bandage is then applied reaching to the knee where it is cut out sufficiently behind to allow flexion of the leg on the thigh. The body part of the spica may be of the usual form or made after the Lorenz method by figure-of-eight turns about the pelvis so that the iliac crests are firmly fixed. This pelvic portion, which is made at least one-half inch in thickness, is then cut out as in the illustration so that it does not restrict greatly the movements of the trunk. If greater fixation is required, as when it is difficult to hold the head of the femur in the acetabulum, the bandage may be extended below the knee, and as the neck of the bone is usually somewhat anteverted it is well at the same time to rotate the thigh slightly inward. When the reduction can be made easily and when the joint is evidently fairly secure, as in certain cases treated at an early age, it is unnecessary to exaggerate the normal range of motion, but it is better to fix the limb in an attitude of moderate flexion and abduction.

In the ordinary class of cases or up to the age of about four years, the reduction in the manner described is not especially difficult. In older subjects preliminary traction in bed until the muscular shortening is in great part overcome is indicated. In certain cases of this class preliminary tenotomy of the hamstrings, of the adductors, and of the muscles attached to the anterior superior spine is advocated by Lorenz, and when reduction is difficult he places a padded block under the trochanter in order to increase the leverage. In this older class, in which great force is necessary to accomplish reduction, which no complaint is made by the patient, who soon attempts to walk. If the limb is fixed in the ordinary position, that is drawn up to about a right angle with the trunk; a shoe with a cork sole two or three inches in height should be worn on the operated side. This first bandage should be kept in place for several months; in younger subjects as long as it is reasonably clean and efficient. When the second bandage is applied, if it is evident that the femur is still in place, the forced attitude is somewhat lessened, the limb is advanced slightly in front of the plane of the body and at the same time lowered to a moderate degree, the height of the shoe being correspondingly reduced.

In certain of the cases in which the foot can be brought to the floor, the high shoe may be removed, the pelvis being tilted downward to accommodate the attitude; thus more direct pressure is exerted upon the rudimentary acetabulum.

The second period of fixation corresponds to the first in time. Practically speaking, the limb is to be fixed in an attitude to guard against reluxation for from eight months to a year according to the character of the case. The fixation bandage is then removed. In successful cases the attitude of abduction and outward rotation often persists for a time. Massage and exercises, with the aim of strengthening the extensors and abductors of the thigh, are of service in the after-treatment.

By this method of treatment applied in a proper manner, a certain number of absolute cures may be attained (in nearly fifty per cent. of the cases Lorenz claims). This proportion is according to general experience far too large, and perfect cure in twenty-five per cent. of selected cases—that is, in patients five years of age or less—is perhaps nearer the true proportion.

In most instances what is really accomplished is a transposition, the head of the femur being forced forward to a position below the anterior superior spine. In many instances this failure is not apparent until the limb is brought to an approximately normal position, in others it is evident on removal of the first bandage. The reasons for failure, even when all the details of the treatment are carried out, are apparent:

1st. Failure to force the head of the bone through the constricted capsule.

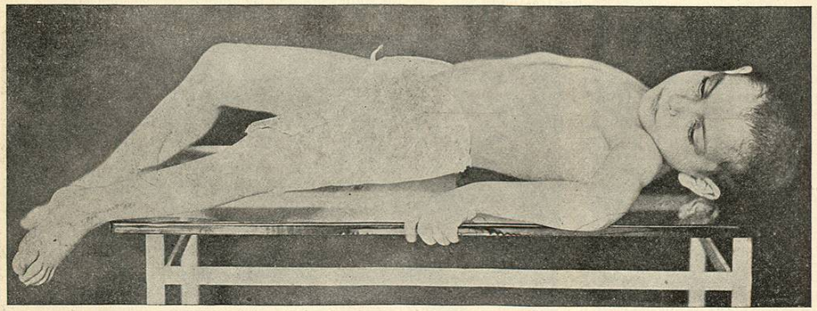

FIG. 2653.—The Lorenz Spica Bandage Illustrating the Typical Position During the Second Stage of the Treatment.

a number of accidents have been recorded; for example, fracture of the neck of the femur, paralysis due to forcible stretching of the nerves, necrosis of soft parts, and several deaths from shock. As a rule, however, in the cases operated on within a reasonable limit of age, surprisingly little discomfort is experienced. There is usually some discoloration and swelling of the adductor region and discomfort lasting for several days, after

2d. The very common anteversion of the neck of the femur that is practically always present in anterior displacements and in a large proportion of the other forms. Thus in the normal attitude the head of the bone cannot be retained in the acetabulum.

3d. Such deformity or non-development that adaptation of the parts is impossible.

The limit of age within which this operation may be

successful cannot be stated with certainty. It is evident, however, that the earlier it is undertaken the greater the chance of success. After the age of five years the difficulty of the manipulation is greatly increased and the chances of success are correspondingly lessened. It may be performed, however, as a preliminary to the open operation, even if the chance of success is small or with the aim of transposing the head of the femur and thus improving the condition of the patient. For such transposition which lessens the shortening and replaces the head of the femur in a relatively normal position, may be classed as a half cure.

The bilateral dislocation is far less favorable for treatment than the unilateral, because the chance of success is in any event lessened by half and because the congenital abnormalities appear to be more marked than in the unilateral class of cases. In young subjects both hips may be operated on at one time, although the resulting attitude is very awkward and walking is practically impossible. In older subjects on this account it is better to treat one hip at a time.

As has been stated, anterior displacements are practically always accompanied by a forward twist of the neck of the femur, anteversion. In such cases the limb must be fixed in an attitude of abduction and inward rotation, the distortion to be corrected later by osteotomy.

THE OPEN OPERATION.—As has been stated, one of the chief obstacles to successful reposition is the interposition of the capsule between the head of the femur and the acetabulum, the failure in other words to force the head through the constriction of the capsule.

In such cases or whenever the simple reposition has been unsuccessful the next step must be the open operation.

If the details of the Lorenz operation have been followed no preliminary treatment is required, but if the open operation is the primary procedure, all shortening of tissues must be overcome either by traction in bed or by forcible manipulation before the parts are exposed.

An incision is made from a point about half an inch to the outer side of the anterior superior spine, and is extended downward and slightly backward for about four inches; the fascia is divided and the line of junction between the tensor vaginæ femoris and the gluteus medius muscles is found. These muscles are then separated and are drawn to either side by retractors, exposing the capsule of the joint. The ilio-psoas muscle which often covers its anterior surface is separated from it, and the capsule is caught with a sharp hook and it is freely opened by an incision parallel to the neck of the bone. The finger is then passed through the opening down upon the rudimentary acetabulum. A strong cervix dilator is then inserted and the contracted capsule is thoroughly stretched. If the ligamentum teres is present it is removed. If on examination the acetabulum appears to be of sufficient size, the head of the bone is placed within it, the capsule is united, and the wound is closed with catgut sutures. A long plaster bandage is then applied and the further details of the ordinary non-cutting method are carried out, except that if anteversion of the neck is present the limb must be rotated inward as well as abducted. In such cases when the first dressing is changed, or at a later time, an osteotomy of the shaft of the femur must precede the return of the limb to the normal attitude.

Osteotomy.—In order to control the head and neck of the femur a long drill is inserted through the trochanter and to a sufficient distance in the neck to fix it firmly. The child is turned upon the sound side and a sand bag is placed between the thighs. A small sharp osteotome is then inserted on the outer aspect of the thigh at a point just below the trochanter minor, and the femur is divided. The upper fragment being fixed in its place by the drill, the shaft of the femur is rotated outward until the normal relation is restored. In this attitude the plaster bandage is applied about the projecting drill. This is drawn out when the new position is assured, that is, at the expiration of a week or more.

The Open Operation with Enlargement of the Acetabulum (the Hoffa-Lorenz operation).—This operation is in principle that originally devised by Hoffa and modified by Lorenz, as the operation of routine for congenital dislocation, but which is now reserved for cases in which the

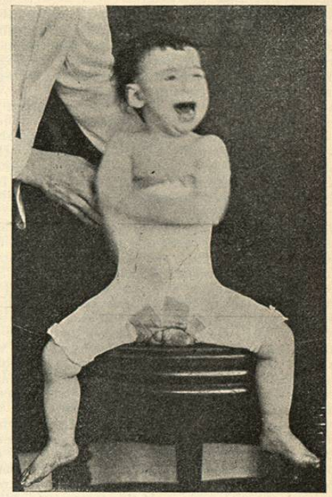

FIG. 2654.—Bilateral Dislocation, Showing the Less Extreme Attitude of the Limbs.

simple reposition has failed or in which arthrotomy seems unlikely to be successful.

If when the joint is opened in the manner described the acetabulum is manifestly inadequate, it may be enlarged by removing with a strong sharp spoon the contents of the rudimentary acetabulum and deepening it to the normal size.

The head of the bone is then replaced and the stability of the articulation is tested by moving the limb in various directions. The wound is then closed or it may be temporarily packed with gauze according to Hoffa's method. A long plaster bandage is then applied, the limb being extended and slightly abducted. If anteversion of the neck is present the femur should be rotated inward and secondary osteotomy must be performed at a later time in the manner described. At the end of eight weeks a short spica bandage is substituted on which the child is allowed to walk about.

As might be expected, this operation is often followed by limitation of motion and by pain on manipulation, symptoms explained by the traumatism of the operation. In such cases, and in fact in the majority of cases, there is a strong tendency to distortion of the limb toward flexion and adduction. It is therefore in this class far safer to fix the limb in a proper attitude by means of the plaster bandage or other appliance until this tendency is overcome, in some cases for a year. In other instances the support may be dispensed with in a much shorter time. A removable apparatus which will allow massage, the use of hot air, and the like, is of course preferable.

When all the symptoms of discomfort have disappeared forcible movements under anæsthesia are some-

times of service in breaking up adhesions and increasing the range of motion. Special exercises to strengthen the weak extensors and abductors are of course indicated in all cases.

The advantages of this operation are that immediate replacement with comparatively small danger of reluxation is assured, while the limb remains in the normal attitude. The disadvantages are the limitation of motion or even ankylosis that may result.

Ankylosis following the operation in unilateral displacement, provided there is no distortion of the limb, is a marked improvement on the original dislocation, but bilateral ankylosis would practically disable the patient. For this reason one should await the result of the operation on one side before treating the other.

Ankylosis is, however, the exception, and in many instances practically normal, or at all events a sufficient range of motion remains. The degree of final disability depends in great part upon the after-treatment. If deformity is prevented, and if the muscles are strengthened by massage and by exercises, a practical cure may be attained, although in most instances a slight limp will persist even in favorable cases.

The danger of the open operation is slight in the hands of competent surgeons, less even than it is in the other method when great force is required to reduce the displacement, as in the treatment of older children.

In conclusion it may be said that the prospect of success in the treatment of congenital dislocation of the hip stands in direct relation to the age of the patient, since the extent of the pathological changes that make cure difficult or impossible depends in great degree, as in acquired dislocations, upon the duration of the disability. Consequently treatment should be applied as soon as the displacement is discovered, and there is little excuse for not making the correct diagnosis as soon as the child begins to walk. The treatment of selection before the age of six years is the functional weighting method of Lorenz. By this means a certain proportion of the cases may be cured, and in all instances the posterior may be changed into an anterior displacement, which makes the after-treatment much easier. If this treatment is ineffective it should be followed by the open method. In the younger patients simple incision and forcible stretching of the capsule may be sufficient, if the acetabulum is well formed; if not, it will be necessary to enlarge it to a sufficient size. Osteotomy may be necessary to correct anteversion of the neck of the femur whichever method is employed to reduce the displacement.

The treatment of congenital dislocation of the hip is not likely to be successful beyond the age of ten years, although in favorable cases it may be attempted. In exceptional cases at the age of adolescence or in adult life, the discomfort attending the dislocation may necessitate excision of the hip. In other instances adduction and flexion deformity may require osteotomy to correct practical shortening.

Other Congenital Dislocations.—Congenital misplacements at other joints are quite insignificant when compared with that at the hip, and in only two situations is the disability of sufficient importance to require especial consideration. These are the shoulder and the knee.

Congenital dislocation at the shoulder may occur in two forms, one in which there is actual misplacement before birth, and the other in which a dislocation is caused by violence at birth. In either case the displacement is almost always backward upon the dorsum of the scapula (subspinous). Thus the arm is abducted and rotated inward and there is the characteristic limitation of motion.

True primary displacement of either variety is rare. Many of the reported cases were apparently subluxations, secondary to the relaxation of the capsule of the joint and to the muscular atrophy caused by anterior poliomyelitis, or to the habitual malposition due to obstetrical paralysis.

Treatment.—The only treatment of a dislocation is replacement of the displaced bone if it be possible. If the displacement were discovered in infancy it might be possible to reduce it by manipulation and, unless the glenoid cavity were undeveloped, it might be retained in proper position. As a rule, however, the cases are not seen until later childhood when the accommodative changes are marked.

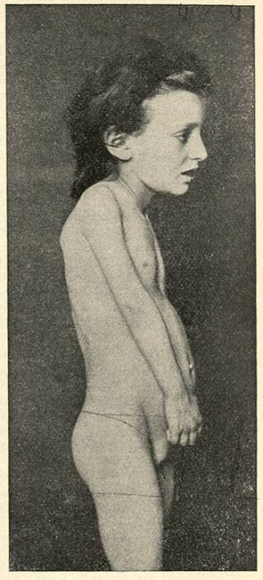

Fig. 2655.—Congenital Dislocation of the Right Shoulder.

Phelps, of New York, has reported several cases of congenital dislocation of the shoulder, caused apparently by injury at birth, as they were accompanied by paralysis. In one case, that of a boy eight years of age, the joint was opened by a posterior incision along the border of the deltoid muscle. The head of the scapula was found to be atrophied, and the posterior margin of the glenoid cavity broken away. This, together with the contraction of the tissues on the anterior aspect of the joint, made it necessary to cut away a part of the head of the bone in order to replace it. The secondary depression on the scapula was excised and the redundant capsule was removed. The immediate result of the operation was very favorable. Phelps states that he has operated in two similar cases, but a final report of the results has not been presented.

It would seem, however, that as in a posterior displacement the contracted tissues must be those in front of the joint, an anterior rather than a posterior incision would be preferable. In all cases the open operation should be deferred until after the contracted parts have been stretched by manual force in the manner described in the treatment of congenital displacement of the hip.

Cases of congenital displacement in other directions are recorded, but these are so rare as to be of little practical importance.

Congenital Genu Recurvatum, or Anterior Displacement of the Tibia.—The most common of the congenital deformities at the knee is the so-called genu recurvatum, in which the knee is bent somewhat backward, or, in other words, the leg is hyperextended on the thigh. The deformity is often classed as an anterior dislocation, but there is no actual displacement, except in the extreme cases in which the tibia may be turned directly forward on the femur, even to a right angle or less. In the ordinary cases the range of extensionis merely exaggerated, while flexion is limited or checked, principally by adaptive shortening of the quadriceps extensor muscle.

The appearance in well-marked genu recurvatum is very peculiar; it is as if the patient's limb were reversed, the popliteal depression having become a prominence,

the range of overextension representing apparently normal flexion. In such cases the leg may be brought to the straight line, but greater flexion is resisted by the retracted tissues, and when the pressure of the hand is removed the leg is drawn back to the deformed position by the contraction of the quadriceps extensor muscle.

Genu recurvatum is not infrequently accompanied by varus or valgus deformity at the knee, more often by the latter, and by laxity of the ligaments. In many instances the patella is absent or is rudimentary and not infrequently deformity is accompanied by malformations or defective development of other parts.

Etiology.—The deformity in cases of simple recurvatum may be explained by an abnormal and fixed position in utero, and in cases seen soon after birth the mechanism is clearly shown by the habitual attitude. The thighs are sharply flexed on the body, the dorsal surfaces of the hyperextended knees are in relation to the abdomen, while the feet may be brought into contact with the face or trunk according to the degree of deformity. The retarded development of the quadriceps extensor muscle explains the rudimentary patella which is often an accompaniment of the deformity.

Treatment.—The treatment of the hyperextended knee is very simple. It consists in massage of the atrophied and contracted muscle, combined with more or less forcible manipulation in the direction of flexion. If, as is often the case, the leg seems to be drawn forward by spasmodic muscular action, the methodical massage should be combined with the use of a simple posterior splint.

In the more extreme cases manual force may be applied under anæsthesia, and the deformity may be overcome at one or several sittings according to the resistance of the contracted parts. The leg is then fixed in a flexed position until the tendency to recurrence has been overcome. When the child begins to walk a light lateral brace may be necessary to insure perfect functional use of the joint, as in many instances laxity of ligaments and muscular weakness may persist for a time.

Rudimentary or Absent Patella.—As has been stated, a rudimentary patella is a frequent complication of genu recurvatum, or of any congenital defect or deformity of the knee or limb that involves imperfect development of the quadriceps extensor muscle. In many cases of this type it is impossible to distinguish the patella during the early months of infancy, but later a minute patella appears that slowly increases to an approximately normal size.

Absence of patella under the same conditions is less frequent, although Potel collected one hundred cases from literature.

Treatment.—The treatment of rudimentary patella is included in the massage and stimulation of the atrophied or rudimentary muscle with which it is usually associated, and the support that the weak or deformed knee may require. *Royal Whitman.*

HIPPOCRATIC OATH.—The ancient Greek writings commonly called "The Works of Hippocrates of Cos" were judged even by ancient Greek critics to be really by various authors. The truth of this conclusion is plain to modern scholars. These writings have probably existed as in some sort a collection since the early days of the Alexandrine library near the beginning of the third century B.C.; and the composition of the several writings may safely be referred to the fifth or fourth century. Which of them are truly works of the famous physician whose name they bear is quite uncertain, as no direct contemporary testimony exists. Modern critics can only sift internal evidence, and compare the views of earlier critics, ancient, perhaps, but often naïve or biassed. Many writings in the collection, however, are plainly as old as Hippocrates, if not older. He was born in 460 B.C.; died, probably, in 377 B.C.; and was a worthy of the great period often styled that of Pericles. There is no proof, however, that Hippocrates was ever at Athens, though he was known there; and scarcely anything is known of his life with certainty.

One of the most famous writings of the Hippocratic collection is that entitled "The Oath." It is probably at least as ancient as Hippocrates, but that he composed it can neither be affirmed nor denied. Traces of its widespread influence occur in history; and by means of it modern physicians still hand down the traditions of their calling to those about to receive a medical degree. The ancient words do not accord with the changes wrought by twenty-two centuries in men, beliefs, and manners; but no modern words can be nobler, and the ancient thoughts are vital to the modern oath. The following translation of the Greek original into English is by the present writer:

The Oath.

I swear by Apollo the Physician, and Æsculapius, and Hygeia, and Panacea, and all the gods and all the goddesses—and I make them my judges—that this mine oath and this my written engagement I will fulfil so far as power and discernment shall be mine.

Him who taught me this art I will esteem even as I do my parents; he shall partake of my livelihood, and, if in want, shall share my goods. I will regard his issue as my brothers, and will teach them this art without fee or written engagement if they shall wish to learn it.

I will give instruction by precept, by discourse, and in all other ways, to my own sons, to those of him who taught me, to disciples bound by written engagement and sworn according to medical law, and to no other person.

So far as power and discernment shall be mine, I will carry out regimen for the benefit of the sick, and will keep them from harm and wrong. To none will I give a deadly drug, even if solicited, nor offer counsel to such an end; likewise to no woman will I give a destructive suppository; but guiltless and hallowed will I keep my life and mine art. I will cut no one whatever for the stone, but will give way to those who work at this practice.

Into whatsoever houses I shall enter I will go for the benefit of the sick, holding aloof from all voluntary wrong and corruption, including venereal acts upon the bodies of females and males whether free or slaves. Whatsoever in my practice or not in my practice I shall see or hear, amid the lives of men, which ought not to be noised abroad—as to this I will keep silence, holding such things unfitting to be spoken.

And now if I shall fulfil this oath and break it not, may the fruits of life and of art be mine, may I be honored of all men for all time; the opposite, if I shall transgress and be forsworn.

The best Greek text (from which the foregoing translation was made) is that of E. Littré, "Œuvres complètes d'Hippocrate" etc., tome 4, Paris, 1844, pp. 628 to 632.

Many commentaries have been published upon the oath. Among these, special mention is deserved by Littré's Argument, *l. c.*, pp. 610 to 625; and by the notes of C. Daremberg, "Œuvres choisies d'Hippocrate," seconde édition, Paris, 1855, pp. 1 to 11.

The following matters require discussion, more or less brief:

Hygeia and Panacea were daughters of Æsculapius.

The distinction between "precept" and "discourse" (*παραγγελίης τε καὶ ἀκροήσιος*) has not been explained satisfactorily.

"Suppository" is perhaps as nearly equivalent as possible to the Greek word *πεσσός*, which doubtless means, in the oath, a sort of medicated pledget to be withdrawn after a longer or shorter time. Many formulæ for making such, for various purposes, are given in the Hippocratic collection.

The words "destructive suppository" (*πεσσὸν φθόριον*) refer to abortion. A parallel and fully developed phrase, viz., "a wine destructive to embryos" (*φθόριος ἐμβρύων*