

SYNOPSIS OF FIFTY-NINE CASES OF EXSECTION OF THE HIP-JOINT FOR MORBUS COXARIUS.

Thirty-nine of these cases are now alive. Of these, twenty recovered with motion, and less than one inch shortening; eight recovered with motion, and more than one inch shortening; two recovered with ankylosis, and nine are still under treatment, with every prospect of good results.

Twenty of these cases are now dead. The cause of death in each case, as well as the length of time after the operation, is as follows:

- Case 2 died from exhaustion on the eighth day.¹
- Case 3 died from exhaustion in two months.
- Case 10 died from tetanus on fifteenth day.
- Case 14 died from exhaustion in two weeks.
- Case 15 died from double pneumonia on fourteenth day.
- Case 16 died from dysentery seventeen months after the operation, wounds having been almost closed for some months.
- Case 19 died from marasmus two years and two months after the operation. Wound had been closed for six months.
- Case 20 died from dysentery in two weeks.
- Case 23 died from dysentery eight months after the operation.
- Case 27 died from phthisis two years after the operation. Wound healed for more than a year.
- Case 29 died from sunstroke from exposure on fortieth day.
- Case 30 died from exhaustion in three weeks.
- Case 32 died from fatty degeneration of the liver and kidneys twenty-three months after the operation. Wound nearly healed; three inches of new bone formed.
- Case 36 died from exhaustion in eighteen months, from progressive disease of the ilium.
- Case 39 died from amyloid degeneration of kidneys in three weeks.
- Case 42 died from sudden suppurative nephritis, two years and three months after the operation. For nearly a year had been able to walk without support.
- Case 43 died from dysentery thirteen months after the operation. Wound had been entirely closed for four months.
- Case 44 died from nephritis from cold, nineteen months after the operation. Had been well for nearly a year.
- Case 47 died from exhaustion two and a half months after the operation.
- Case 49 died from exhaustion in one month.

Of these twenty cases that died, eight had recovered from the operation some time previous to death, which was caused in each

¹ The figures refer to the number of the case in the table.

case by some other disease entirely foreign to the operation (cases 16, 19, 27, 32, 36, 42, 43, 44).

Of the twelve remaining, four died from acute intercurrent diseases, such as tetanus, double pneumonia, dysentery, and sunstroke (cases 10, 15, 23, 29). This leaves but eight who have died from the exhausting effects of hip-disease, without some intercurrent complication (cases 2, 3, 14, 20, 30, 39, 47, 49).

LECTURE XXIV.

DISEASE OF THE JOINTS.—THE DISEASES WHICH SIMULATE HIP-DISEASE.

Sacro-Iliac Disease.—Disease of the Knee.—Caries of the Ilium.—Caries of the Ischium.—Periostitis of Adjacent Parts.—Psoas Abscess with Pott's Disease.—Inguinal Abscess.—Inflammation of the Psoas Magnus and Iliacus Internus Muscles.—Congenital Malformation of the Pelvis, commonly known as "Congenital Dislocation."—Paralysis of the Lower Extremities.—Injuries of the Hip, including Diastasis, Fractures, and Dislocations.

GENTLEMEN: At my last lecture we completed the study of hip-disease, and I invite your attention this morning to some of the diseases which simulate it.

Hip-joint disease is liable to be confounded with sacro-iliac disease; disease of the knee; caries of the ilium or ischium; periostitis of the parts adjacent to the hip-joint, particularly of the great trochanter. It is more rarely confounded with psoas abscess associated with Pott's disease; inguinal abscess; inflammation of the psoas magnus and iliacus internus muscles; congenital malformation of the pelvis, commonly known as "congenital dislocation;" paralysis of the lower extremities, and injuries to the hip.

SACRO-ILIAC DISEASE.—The anatomy of the sacro-iliac junction is thus given by Gray:

"The sacro-iliac articulation is an amphiarthrodial joint, formed between the lateral surfaces of the sacrum and ilium. The anterior or auricular portion of each articular surface is

covered with a thin plate of cartilage, thicker on the sacrum than on the ilium.

"The surfaces of these cartilages in the adult are rough, and irregular, and separated from one another by a soft, yellow, pulpy substance. At an early period of life, occasionally in the adult, and in the female during pregnancy, they are smooth and lined by a delicate synovial membrane. The ligaments connecting these surfaces are the anterior and posterior sacro-iliac.

"The anterior sacro-iliac ligament consists of numerous thin ligamentous bands which connect the anterior surfaces of the sacrum and ilium.

"The posterior sacro-iliac is a strong interosseous ligament, situated in the deep depression between the sacrum and ilium behind, and forming the chief bond of connection between these bones. It consists of numerous strong fasciculi, which pass between the bones in various directions. Three of these are of large size. The *two superior*, nearly horizontal in direction, arise from the first and second transverse tubercles on the posterior surface of the sacrum, and are inserted into the rough, uneven surface at the posterior part of the inner surface of the ilium. The third fasciculus, oblique in direction, is attached by one extremity to the third or fourth transverse tubercle on the posterior surface of the sacrum, and by the other to the posterior superior spine of the ilium; it is sometimes called the oblique sacro-iliac ligament. There is only very slight movement between the bones themselves."

Disease of this joint is quite common, and is invariably of traumatic origin. I have seen a number of cases in which the disease originated in injuries received by the little patients as they slipped over behind a trunk and got caught between it and the wall, where they were doubled up very tightly. In their efforts to get out while jammed down between the trunk and the wall, the junction of the sacrum and ilium is brought in contact with the edge of the base-board, and gets bruised sufficiently to set up an inflammation of the parts injured.

While the inflammatory process is going on, the patient will complain of difficulty in making water, difficulty in having a movement from the bowels, and more or less pain in the bowels; in short, the same class of symptoms referable to the front part of the body of which the patient complains who has Pott's disease

of the spine. After a while an abscess may show itself, which may be posterior at the upper part of the sacrum, or up along the side of the spine, or extending in various directions, and may possibly work its way through between the sacrum and ilium, and appear upon the anterior portion of the thigh.

Of course, when it has reached this point, it is almost a hopeless case for treatment. The symptoms which are present in the early stages of the disease are very much like those of hip-joint disease.

That is, the child cannot walk without limping, and walking also gives him pain. Concussion of the head of the femur against the acetabulum also causes pain. Crowding upon the great trochanter causes pain, because the pressure is transmitted through the ilium to the part involved by the disease.

But, when the wings of the ilia are held firm, and then an examination of the hip-joint made in the manner described to you when speaking of hip-disease, no pain will be produced, and free motion can be made. In hip-disease, abduction or rotation outward, or adduction or rotation inward, depending upon the stage of the disease present, aggravates to a greater or less extent, often almost intolerably, the sufferings of the patient. In this manner you can exclude the probability of disease of the joint.

Now make direct compression upon the wings of the ilia, crowding the bones against the sacrum, and you will produce pain at once, and at the seat of the disease. If extension is made, the pain will be relieved, and that is also true of hip-disease; but, when the pelvis is firmly held, and compression made of the hip-joint only, it will not develop pain if the disease is at the sacro-iliac joint, but it will develop pain if the disease is at the hip-joint.

Now turn the patient upon the face, and make pressure along the line of the sacro-iliac junction, and you will find that the greatest degree of pain is produced in that region. There may be more or less tenderness all over the gluteal region and about the hip-joint, but the greatest amount of pain will be produced by pressing immediately over the articulation.

In sacro-iliac disease there is no abduction or eversion of the limb as there is in the first and second stages of hip-disease, but simply elongation. On the contrary, the distortion present in

sacro-iliac disease is a distortion of the body. (See Fig. 196.) The patient bends the body over to the opposite side, so that the weight of the limb may make extension sufficient to give relief

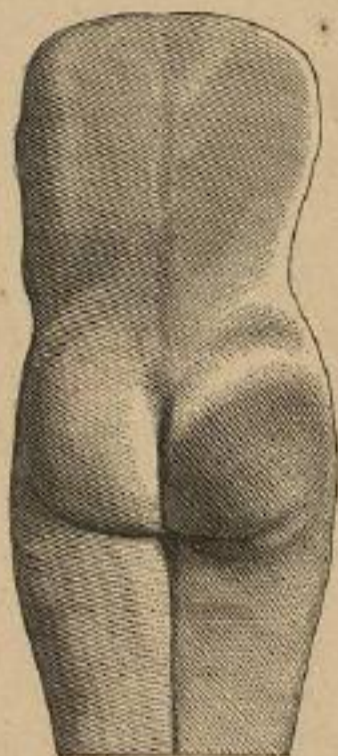


FIG. 196.

to the diseased articulation. (See Fig. 197.) This bending over to one side, for the purpose of removing pressure from the diseased structures by bringing the weight of the limb to bear upon the ilium, produces a deformity that is peculiar and characteristic of sacro-iliac disease. (See Figs. 197 and 198.)

In sacro-iliac disease the lengthening of the limb is absolute, while in hip-joint disease it is only apparent. In hip-disease the elongation is discovered by measuring from the anterior superior spinous process of the ilium to the internal malleolus, and is caused by the effusion into the hip-joint. The elongation is *apparently* greater than it really is, and is due to the twisting of the pelvis. In sacro-iliac disease the distance between the malleolus and anterior superior spinous process of the ilium is the same upon both sides. When the disease has progressed so far that abscesses are present and openings formed, it should be recognized at once; for, by means of the flexible or vertebrated probe, dead bone can often be detected.

TREATMENT.—The principles of treatment are the same which guide us in the treatment of all joint-diseases, namely: rest, extension, and counter-extension. We must devise some means, however, if possible, by which we can apply extension without



FIG. 197.



FIG. 198.

confining our patient in bed. This can be very easily accomplished by making the sole of the shoe worn upon the well foot of sufficient thickness to permit the affected limb to swing free, so that its own weight may become an extending force. If the weight of the limb is not sufficient to make the amount of extension required, lead can be run into the sole of the shoe, and thus the weight can be increased as circumstances may require. Now give the patient a pair of crutches, so that the weight of the body shall be received by the axillæ and not by the pelvis, and all the indications in treatment have been met. Darrach's wheel-crutch is a very admirable support in these cases. If the case is one of long standing, and there is more or less deposit in and about the joint, or if the inflammation does not readily subside, application of the actual cautery directly over the sacro-iliac articulation will be of the greatest service. The actual cautery is preferable to any other means of counter-irritation. There is nothing like the

action of intense heat in the treatment of many of these cases. There is a relaxed condition of the ligaments, and an engorged state of the blood-vessels, which can be more effectually relieved by the use of the actual cautery than by any other means that can be employed. The contractility of the blood-vessels is excited, by which means they are emptied, and in this manner venous engorgement is relieved, and, as the wound heals up, the cicatrization that follows contracts and condenses the ligamentous structures in such a manner as to firmly hold the joint in position when recovery has taken place. If the disease has progressed, and suppuration becomes established, then, instead of cauterization, lay the parts open freely, passing down until you have laid the joint bare, and, if the probe detects dead bone anywhere, follow it up by freely laying the sinuses open, or make counter-openings, and gouge it out, for it must be removed before the patient can get well.

CASE.—Psoas Abscess from Sacro-Iliac Disease mistaken for Hip-Disease.—Cornelius M., aged four years and nine months, came to me at Bellevue Hospital, December 15, 1872, to be treated for disease of the right hip-joint. He had been complaining for some months and had been lame for several weeks; had complained all summer of stomach-ache, and had been treated for worms, but for the past two months had been treated for hip-disease, and was sent to me to be treated for that disease. Upon a careful examination before the class, I could find no disease of either hip-joint, but a manifest tenderness over sacro-iliac junction of both sides, but more particularly on the left side. No swelling of the inguinal glands on either side. The mother states that he was a very active child, and his father used to make him jump over boxes, and from great heights, and in one of these jumps he hurt his back, but they had forgotten this fact, until I questioned her upon the subject. I lost sight of this child until January, 1874, when he was again brought to the hospital, presenting the appearance as seen in Fig. 199. An immense abscess on the left groin nearly ready to burst. No disease in either hip, but well-marked disease in both sacro-iliac junctions. Boy died June 10, 1874, from exhaustion; was seen twenty-four hours before death, and was found to be dying from the excessive discharge from a sinus existing in the inguinal region, and a sinus on upper and outer portion of thigh.

Post mortem, twenty-four hours after death, revealed extensive caries of both sacro-iliac junctions, and extensive abscess extending down psoas muscles on either side, on the left coming out above Poupart's ligament, and on the right passing under the



FIG. 199.

ligament and extending down the thigh. Both hip-joints were perfectly healthy.

KNEE-JOINT DISEASE is sometimes mistaken for morbus coxarius. The *pain* of hip-joint disease is very often referred to the knee, thereby causing the disease to be mistaken for synovitis of the knee-joint. So also when the knee-joint is really diseased the deformity present may simulate that which is seen in the *second stage* of hip-joint disease.

The position of the limb in disease of the knee is one simply of flexion at the knee and hip, accompanied with dropping of the corresponding natis. The dropping of the natis is caused by throwing the weight of the body upon the sound limb and allowing the diseased limb to be pendent. At a later period in the disease it may depend upon the muscular contraction which attends chronic disease of the knee-joint.

The position of the limb in the second stage of morbus coxarius

arises from effusion within the capsule and contraction of the psoas and iliacus muscles, and is an anatomical necessity.

So far as position is concerned, then, the difference in *origin* is important in the differentiation of the two diseases. Again, the position of the limb in hip-disease is constant as long as the effusion remains within the capsule; while the position in knee-disease may be varied at will.

In hip-disease, second stage, the limb is *always* in advance of the sound one, the toe touching the floor; while in knee-disease it is *sometimes* in front for the sake of comfort, but the patient is able to bring the heel behind the sound one, and often does so place it, or even bring it to the ground, and is able to evert or invert, adduct or abduct the limb at pleasure. When the patient can perform these movements you may be certain that the second stage of morbus coxarius is absent.

When knee-disease has advanced to a considerable degree, there is strong adduction of the limb for the sake of balance; the popliteal space closely hugs the patella of the sound knee, and the heel is generally behind the sound one, but sometimes it may be carried forward for the sake of resting.

In the third stage of hip-disease, for which *advanced* knee-disease is perhaps more likely to be mistaken, there is adduction, *raising of the pelvis* and whole *limb*, inversion of the foot so that the toe of the diseased side rests upon the instep of the sound foot.

CARIES OF THE ILIUM.—This affection has been frequently mistaken for hip-disease. A deformity may be present, and it may be accompanied by an excessive discharge of pus, and many other symptoms of hip-disease; but the peculiar deformity which is present when the hip-joint is involved is not seen in cases of caries of the ilium. Abduction and eversion at a certain stage are not necessarily present, as in the second stage of hip-disease; nor are adduction and inversion necessarily present as in the third stage of hip-disease.

A diagnosis in these cases is to be made to a certain extent by exclusion. If we place the patient in the position so frequently referred to, with the pelvis and trunk in proper relation to each other, and *fix the pelvis*, slight motion can be made at the hip-joint without causing pain, so long as the ilium is held firmly in position.

Your direct examination is to be made with the probe, which will enable you to determine whether there is any dead bone or not. For this purpose the flexible probe is the only one that should be employed, for it will follow a lead but will not make an opening.

If you will remember the points in diagnosis of hip-disease and keep them accurately in your mind, it seems almost impossible to confound it with caries of the ilium.

As I shall not lecture upon caries of the ilium separately, I will mention the treatment in this connection.

TREATMENT.—This is simple, and consists in making a free incision down to the dead bone and removing it. If the disease involves parts of the ilium where it would be dangerous to cut, the sinuses may be dilated by means of laminaria or sponge-tents, until they are of sufficient size to permit the introduction of the elevator for the purpose of clipping off what dead bone can be easily reached, and then removing it with the forceps. If it is not possible to remove all the dead bone at once you may drill through, pass in oakum strings or India-rubber drainage tubes, and wait until Nature removes the remainder by exfoliation. The danger in these cases is not from dead bone, but from imprisoned pus, making tortuous sinuses in different directions and ultimately producing death from exhaustion. Therefore, if you are not able to remove all the dead bone at once, if you can establish a free drainage in the proper direction, you have done the best possible thing for your patient in the way of local treatment.

CASE.—Thomas K. C., aged fourteen, Jersey City, N. J. In infancy puny and feeble, inactive, walked when three years old; was fleshy but unhealthy, has improved since he was five or six years old. In summer of 1864 had nates repeatedly bruised by kicks, and by riding a rough-trotting horse. The bruises were treated with the usual domestic remedies. In the fall he was again injured by being thrown down the stone steps at school, and trampled on, and was also severely beaten by a man with a heavy cane. Soon after this the boy began to suffer from cramping pains in the left toes, the pains gradually extending up to the hip. The surgeon who saw him thought an abscess was forming which would result in hip-disease. There was an extensive swelling over the lower part of his back, but no pointing to indicate its exact locality. In the summer of 1865 an abscess was opened in the left

gluteal region, and discharged from it a very large quantity of pus. For a while he seemed to improve, but in the fall of 1865 he had general anasarca from anæmia, and it was thought his case would terminate fatally. All the physicians who had been consulted looked upon it as a case of advanced hip-disease. He was sent to the country in the fall of 1865, and used iron and cod-liver oil freely. He improved for some time, but in the spring of 1866



FIG. 200.

another abscess formed lower down on the buttocks, when he was seen by a surgeon in Ohio, who called it hip-disease. During the summer of 1866 another abscess formed, making four in all. Dr. C. Grahn, of the Ohio Medical College, then saw him, and was the first who said it was *not a disease of the hip-joint*. Various salves and ointments were applied to the sores, which continued to discharge more or less until August 16, 1868, when he was brought to me in the condition seen in Figs. 200 and 201, with several sinuses on the nates near the sacrum, as seen in Fig. 200, and two in the perinæum, as seen in Fig. 201, all leading to dead bone on the back of the ilium, and the tuberosity of the ischium, but the *hip-joint was perfectly healthy*, and had never been involved in the disease. By dilating the various fistulous openings with spongetents, I was able in a few days to pass a flexible silver probe from

the posterior openings through to the perinæum, as seen in Figs. 200 and 201 (1, 1, and 2, 2, represent oakum setons drawn through the fistulous tracts by the side of the dead bones). One piece of bone about the size of the thumb-nail was knocked off, and came out entangled with the oakum on the first day. This oakum was saturated with Peruvian balsam, and the concealed part drawn through daily, and the soiled oakum cut off. Small pieces of bone continued to come away for three or four months, but the

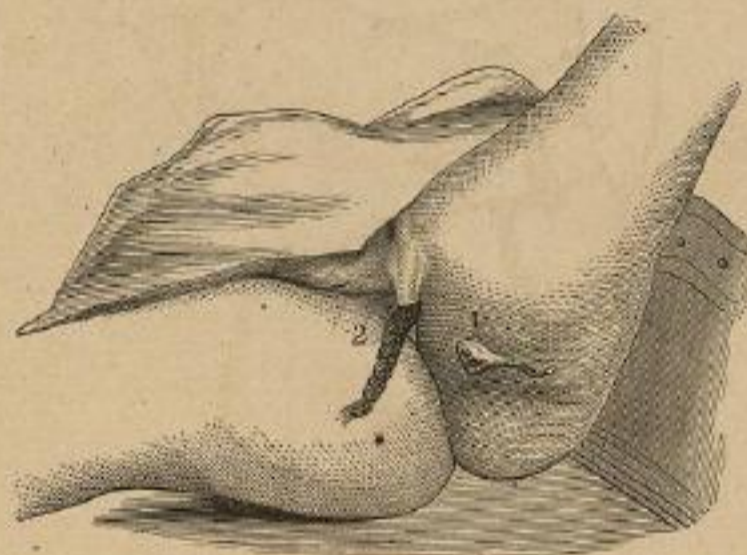


FIG. 201.

boy's health began to improve from the day free drainage was established, and he began to have more use of his limbs. By passive motions, friction, and frequent handling, he gradually recovered his *perfect form*, as seen in Fig. 202, and was discharged cured, and with *perfect motion*, in June, 1869. I received a letter from his father, Rev. T. K. C., dated April 27th, 1871, saying: "Our Tom is a *trump*, that you know is the short for *triumph*. He can run through a troop and leap a wall, he can ably wrestle against flesh and blood; he can travel on his muscle. Without a doubt the *very* best reason is, the fact of your frequent manipulations of the boy. . . . He and we all feel very grateful to Dr. Sayre."

March 7, 1873.—Father called to say Tom was in excellent condition.

CARIES OF THE ISCHIUM is more deceptive than the last-named disease.

The following case, which was under the care of Mr. Callender, has been taken from the report made in the *British Medical*



FIG. 202

Journal for July 22, 1871, and was mistaken for hip-joint disease:

CASE.—“About six years ago, A. R., aged forty-five, by occupation an omnibus-driver, first noticed some tenderness about the left gluteal region, which was followed by swelling, and ultimately by the formation of an abscess in the ischio-rectal fossa and middle of the back of the thigh, which broke about twenty months ago, and has been discharging ever since, despite treatment at various institutions.

“Several sinuses, with pouting, granular orifices, occupied the left ischio-rectal region, and one sinus had its opening on the middle of the back of the left thigh. Into any of these a probe could be passed in the direction of the tuberosity of the ischium; but, owing to the tortuosity of the passage, failed to reach any dead bone. Dr. Sayre, who saw the case at a consultation on the 13th inst., remarked on the coincidence that it was in a precisely

similar case that he first used his flexible probe in America, and this instrument traversed with great ease the winding course of the sinus until its point was distinctly arrested by bare bone.

“On the following Saturday, Dr. Sayre being present at the operation, a free incision was made over the left tuber-ischii, and a considerable portion of dead bone was removed from a cavity in the tuberosity, in which it was contained. The sinus which traversed the thigh had followed the course of the muscles arising from the tuberosity.”

PERIOSTITIS OF THE TROCHANTER has also been confounded with morbus coxarius.

For convenience in study, the symptoms of these two diseases have been tabulated below:

PERIOSTITIS OF FEMUR.	THIRD DEGREE OF MORBUS COXARIUS.
Mostly commences suddenly.	Grows gradually out of preceding stages.
Femur more or less enlarged.	Not at all enlarged.
Femur painful on pressure.	Femur not painful in the least.
Joint free.	Almost fixed, and, when moved, often have crepitus.
Extension and abduction impeded.	The same.
Joint painless.	Joint painful on pressure.
Pelvis oblique and spine curved.	The same.
Contraction of flexors and adductors.	The same.

The following cases will further illustrate the distinctive features of the two diseases:

CASE. *Periostitis of Trochanter and Upper Extremity of Femur mistaken for Hip-Disease.*—Hamilton L., aged nine, Clinton, Worcester County, Massachusetts, was brought to me October 2, 1867, to be treated for diseased hip-joint. He had on at the time one of my short hip-splints, which he had been wearing for some months, but receiving no benefit his physician sent him to me to see if anything further could be done. Inquiring into the history of the case, I found that he had been struck by a brick on the *outer* and *posterior* part of the right trochanter major, thrown by a boy. The pain was intense for a little while, but the next day he played as usual without pain, unless some one touched the outer part of the thigh at the place where he was struck. Some time after, he fell and struck the same place on a fire-dog or and-iron. About two months after he fell again in a heap of coal,

and struck the same place with such violence as to cause intense pain, and from this time the inflammation and swelling commenced, which in three months resulted in abscess, which was opened by Dr. De Witt, U. S. A., just behind and below the trochanter major. This was about five months after the first fall. Dr. De Witt, as the father states, told him that the joint was all right, and that he could find no naked bone. This opening has continued to discharge up to the present time. Three months after the first opening another abscess formed and opened itself directly at the part where the first blow was received. Another a few months after opened on the front of the thigh about four inches below Poupart's ligament.

Present Condition.—Very much emaciated, weighing forty-two pounds; right thigh flexed and slightly abducted, but toes not everted as in second stage of hip-disease (as seen in Fig. 203, from photograph taken at the time).



FIG. 200.

The father states that the toes never were everted, but rather tended to *turn in*. At the present time they are not inverted or everted; the limb is of the same length as the other, the big-toe

touching the floor; a hard, inflammatory swelling just above the tuber-ischii, which may probably terminate in another abscess. The knee is flexed at nearly a right angle (*see figure*), and fixed by fibrous ankylosis. The father says that previous to the first accident the boy was in perfect health, and very robust and active.

DIAGNOSIS.—Our diagnosis is periostitis of the trochanter major, with cellulitis and abscess *around the joint, but not involving the articulation*. At this moment Dr. Gross, of Philadelphia, happening to come into my office, I asked him to examine the boy, who was still naked upon the table. He stated that it was a case of hip-disease "so well pronounced as to require no examination," but, after drawing his attention to some of its peculiarities, he immediately acknowledged his mistake.

TREATMENT.—Leave off the splints and extension; as the disease was not within the joint, no extension is required. Apply flax-seed poultice and open the abscess when necessary. Keep him out-doors and improve his general health by a nutritious diet; make passive motions at the knee, and increase these movements as he can bear them. Directed to bring him back at the end of the month.

I saw no more of this boy until September 22, 1868, when Mr. Lewis, his father, called to inform me that he was in perfect health, and that my diagnosis had been correct, although upon his return to Massachusetts the year before, Dr. Warren, Dr. West, Dr. Bigelow, of Boston, and others, had still informed him that the disease was in the hip; he, however, had followed my advice, applied motion to the knee, which was now straight, and all of its motions perfect. Motions in the hip were very greatly improved, but not quite so perfect as on the opposite side. One abscess had opened near the tuberosity of the ischium, but was now healed; no bone had escaped. He now weighs fifty-eight pounds, and is in perfect health.

CASE. Periostitis of Trochanter Major, mistaken for Hip-Disease.—Kate B., aged eight, of Bridgeport, Connecticut. Her health has never been very good. Sixteen months since fell from a ladder; one month later the disease began by pains in and around the knee, very similar to hip-disease. Condition, September 10, 1867: Limb slightly atrophied; same length as the other; no pain on pressure in the joint, but acute pain on press-

ure just below trochanter major. Motions of the joint not quite so free as the other. Flexion limited, very similar to hip-disease, but can *adduct* and *rotate* the limb *inward*, which cannot be done if the disease is *within the joint*. There is slight tenderness of nearly entire length of thigh on the outer side.

TREATMENT.—Rest, leeches, and then *actual cautery* over and behind trochanter major.

June 15, 1871.—This patient presented herself with a *perfect hip*, but has a large bursa *behind* the trochanter, which somewhat interferes with the *motions* of the joint. The mother thinks it is the result of a fall from a swing last autumn. She had been perfectly well for three years previous to the fall. This bursal sac was opened freely and soon healed, leaving her in perfect health.

With this case I received a note from the attending surgeon, in which he said that the limb was *flexed* and *adducted* in the early stage of the case. Now, this did not indicate hip-joint disease, for the reason that *flexion* and *adduction* do not go together in the early stage. If the limb was *flexed* and *adducted*, it should be in the third stage of hip-disease, after rupture of the capsule has taken place. It was also stated that the toes were *inverted*. If effusion had taken place within the capsule, the toes must have been *everted*, unless rupture of the capsule had occurred. If rupture of the capsule had occurred, the limb should have been *adducted*, *flexed*, and the toes *inverted*; therefore, the very fact that the limb was *adducted* and *flexed*, and the toes *inverted* during the early stages of the disease, was evidence that the difficulty was *not* in the hip-joint, but was the result of reflex muscular contraction. The periostitis had produced muscular contractions which had developed distortions, and exhausting suppuration was also present; but that peculiar distortion which would have been present had the disease been within the hip-joint, was not seen, and the result of the case proved my diagnosis to have been correct.

POTT'S DISEASE AND PSOAS ABSCESS may possibly be mistaken for hip-joint disease in the third stage. The distinctive symptoms of the two diseases are here arranged side by side to aid in the differential diagnosis in the following table (from Bauer). The arrangement of the symptoms in this manner makes them more easy to remember.

POTT'S DISEASE AND PSOAS ABSCESS.	THIRD STAGE OF MORBUS COXARIUS.
Preceding pain in the <i>spine</i> .	Preceding pain in hip-joint.
Posterior and anterior deformity (not always).	Lateral and anterior deformity.
Simple flexion and shortening of limb.	Flexion, adduction, and inversion.
Limb may be extended under chloroform.	Cannot.
Pelvis square.	Pelvis oblique.
Nates even.	One higher.
Cannot walk except by supporting the spine by resting hands on the knees.	Can walk on well leg, and without these precautions.
Abscess under Poupart's ligament.	May have the same.
Hip articulation free.	Almost fixed.
Slight retraction of flexors.	Fixed contractions of both flexors and adductors.
May have signs of paraplegia.	Has none. Order of development, very different. If there is perforation of the acetabulum, it may be ascertained by an examination through the rectum.

INGUINAL ABSCESS may be mistaken for the first stage of hip-joint disease. In inguinal abscess extension and abduction will increase the pain by bringing the inflamed parts under pressure; whereas, in the first stage of morbus coxarius, these movements will *diminish* the pain by relieving the inflamed parts from pressure. Pressure on the shaft of the femur, or on the trochanter, will increase the pain in the first stage of morbus coxarius, but will not necessarily do so in inguinal abscess. In inguinal abscess great pain will be caused by direct pressure upon the abscess itself.

INFLAMMATION OF THE PSOAS MAGNUS AND ILIACUS MUSCLES may produce flexion of the limb, and there may be slight eversion, simulating the advanced first or commencing second stage of morbus coxarius. But pressing the head of the femur into the acetabulum, either from the knee or from the trochanter major, does not increase the pain, showing that the trouble is not in the joint. On the other hand, the pain is aggravated by extension, whereas in hip-disease extension affords relief.

CONGENITAL MALFORMATION OF THE PELVIS, commonly known as "double congenital dislocation," may be confounded with hip-joint disease, as in the case now before you, which was sent to me to be treated for hip-disease. I object to the term congenital

dislocation, for the reason that we cannot with propriety speak of a *dislocation* until there has first been a *location*. Again, a real dislocation of the hip-joint in the normal pelvis, I believe, cannot be produced by the movements of the fœtus *in utero*. It might be caused by the manipulations of the *accoucheur*, but in that case it could not be properly called spontaneous.

The real difficulty in this condition, which has been termed congenital dislocation, but which I prefer to call congenital displacement, consists in the *malformation* of the acetabulum, namely, a non-fusion of the three bones which enter into its construction. The cavity of the acetabulum being incomplete, the head of the femur rides through the opening left, and is found upon the dorsum of the ilium. Inasmuch, therefore, as the acetabulum has never really existed, in consequence of an arrest of development, there can, of course, be no *dislocation* from it. You might as well speak of the *roof* of a child's mouth with cleft palate. For the same reason *reduction* with retention is impossible, so long as the imperfection remains. The deformity, however, is frequently mistaken for hip-disease, considering the rarity of the malformation. It is not difficult, usually, to arrive at a correct diagnosis in these cases, if the following points are carefully considered:

Congenital dislocation (dependent upon congenital malformation) generally occurs in both hips; morbus coxarius almost invariably occurs only in one.

Congenital displacement is not attended with pain; while morbus coxarius is attended with extreme pain. In congenital displacement the deformity is peculiar, and differs essentially from that present in hip-disease. The breadth of the hips is very much increased, the pelvis is tilted forward and downward, the buttocks rounded out and elevated, making a very prominent hump when the patient is standing; but, when he is placed in an horizontal position, and extension is made upon both limbs, the hump will disappear, and he will be elongated; and then, by pressing upward upon the limbs, the hump can be made to reappear. If, while an assistant makes such extension and pressure upward, the fingers are placed over the trochanters, they will be found to glide up and down, like the lengthening or shortening of a telescope. If the finger is introduced into the rectum in young children, a distinct fissure in the plane of the ischium can be

sometimes felt. In the adult pelvis the plane of the ischium will often be much wider than normal. The distance from the crest of the ilium to the trochanter major, when the limbs are pressed firmly upward, or when the patient is standing, will be shorter, as seen in Figs. 204 and 205, than when the limbs are firmly extended, as seen in Figs. 206 and 207.

Laying this child upon the table, we will first apply Nélaton's test, which consists in drawing a line from the tuberosity of the ischium over the hip to the anterior superior spinous process of the ilium. This line passes directly over the top of the trochanter major if the head of the femur be in its socket and there is no fracture of the neck. In this case, even in so small a subject, we find the trochanter one inch and a half above the line. We



FIG. 204.



FIG. 205.

will next slip this piece of paper beneath the child, and pencil on it her form as she lies on the table, and now, pulling her out, see how we increase her length until her trochanter reaches my finger on Nélaton's line; releasing our extension, and pushing against her feet, she goes together again—telescopes—like pushing a pencil in its case, and the trochanter is nearly two inches above the line. Here, gentlemen, is the paper with the pencil-

ing upon it—a drawing from life—and you can see the great difference in her form in the extended and shut-up conditions. (See Fig. 208, from a sketch taken at the time.)

In congenital displacement, motion is often perfectly free and painless, and ordinarily somewhat more extensive than normal; while in morbus coxarius it is *always* limited, and ALWAYS attended with pain.

TREATMENT.—In this child I propose to arrange something that will keep the limbs extended, and prevent their gliding upward, and also to put around the pelvic bones a compress which will assist in holding the heads of the femurs steady and approximate the edges of the fissured acetabulum.

I have seen a fissured palate in an infant, which involved the



FIG. 206.



FIG. 207.

whole roof of the mouth, closed by means of compression. I operated upon this child when it was but three hours old, perhaps the youngest on record—by removing the proboscis, bringing the lips together, and applying over the malar bones a U-compress to gradually approximate the edges of the fissure; and now, at the age of twenty-three, he has as good a roof to his mouth as any of you. It is this simple principle, gentlemen, that I propose to put

in use in this child. It should have been done at birth; but the child is yet young, and much benefit to it may still be anticipated.

I have had made for this patient, by John Reynders & Co., of 309 Fourth Avenue, a double long hip-splint, capable of extend-

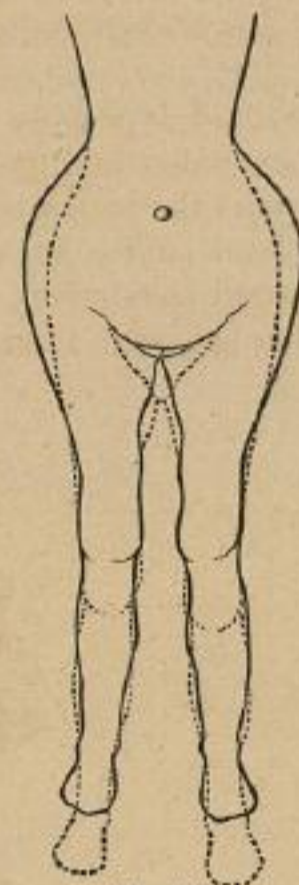


FIG. 208.

ing the limbs and permitting universal motion. It is applied the same as the hip-splint; i. e., adhesive plasters are put on the legs, secured by a roller, with tabs sewed to their lower extremities, to which is attached the splint by means of buckles; a pelvis belt, hinged behind and clasping in front, goes around the ilii and perineal bands from the pelvic belt in front around the perineal folds, fastening to the belt behind. The instrument is extended by ratchet and key, and held in the extended position by a catch.

By this instrument we can elongate the child, as you perceive by comparing Figs. 204 and 205 with Figs. 206 and 207, and, slipping down the catch, we hold her legs extended; she cannot shut herself up until some one touches the key.

Do you see, gentlemen, how beautifully we can extend these limbs and hold them in their natural places! With this instru-

ment to keep the limbs extended, the compress to approximate the edges of the fissure, and a Darrach's wheel-crutch to give her out-door exercise, it is possible we may obtain a good result. In the course of a month or two the child will be returned to us, and we can then see what progress will have been made.

PARALYSIS OF THE LOWER EXTREMITIES, causing arrest of development, has been mistaken for hip-disease.

This error I have seen occur several times. The first case I ever saw was sent to me by a distinguished surgical friend, for some hip-trouble.

CASE. *Arrest of Development from Infantile Paralysis.*—Julia H. E., aged nine, of Winchester, Tenn., of healthy parents, always in good health until she was twenty months old, when she lost the use of her right leg suddenly, waking up in the morning with total loss of motion and sensibility. Began to move her toes in about six months, and in a year dragged her foot after her, but would fall down about every third step. Condition as seen in



FIG. 209.

FIG. 210.

Fig. 209, from a photograph taken August 27, 1867. Large and well-developed child, except right limb, which is four and a half inches shorter than the left, and small in proportion. Spinal column very much curved laterally at the junction of the dorsal

and lumbar vertebræ, the pelvis of the right side being much lower than the other. The case was sent to me as a case of luxation of the femur, but I found it merely a case of arrest of development and atrophy, from infantile paralysis. There was slight contractility of all the muscles, showing that fatty degeneration had not taken place, but the difference in the length of the two limbs was the principal cause of her lameness. I applied to her shoe a sole and heel sufficient to equalize the length of the limbs, when her spine became perfectly straight, as seen in Fig. 210, and she was enabled to walk without a crutch or cane, by simply applying India-rubber muscles, to take the place of the partially paralyzed ones of the leg. Advised electricity, shampooing, and passive movements.

The treatment in this case was so entirely satisfactory that she left for home on September 15th, able to walk remarkably well with the aid of the rubber muscles and the increased length of heel to her shoe. The extreme curve that can take place in the spine to accommodate the difference in the length of the limbs is well shown in Fig. 205, and this case is also an instructive one in having been mistaken by so many eminent men for a case of hip-disease.

INJURIES OF THE HIP may be mistaken for hip-joint disease. These include fractures, dislocations, diastasis, etc.

Injuries of the hip can generally be excluded by the history of the accident which caused the trouble. The following differential signs (from Bauer) will enable you to determine the question in case of doubt:

Dislocation of Femur.

ANTERIORLY AND SUPERIORLY.	SECOND STAGE OF MORBUS COXARIUS.
Suddenly produced.	Comes on gradually.
Extremity much everted.	Less everted.
Immobility.	Immobility.
Moderate shortening.	Apparent elongation.
Abduction.	Abduction.
Head can be felt in the groin.	Head cannot be felt at all or very indistinctly, and then at the acetabulum.
POSTERIOR SUPERIOR DISLOCATION.	THIRD STAGE OF MORBUS COXARIUS.
Produced suddenly.	Growing gradually.
Limb shortened and inverted.	The same.
Adducted.	The same.

Dislocation of Femur.—(Continued.)

POSTERIOR SUPERIOR DISLOCATION.	THIRD STAGE OF MORBUS COXAERIUS.
Immobility of articulation.	The same.
Flexion of the hip.	The same.
Moderate shortening.	Apparent shortening considerable.
Head usually felt under gluteus maximus.	Head not felt at all.
Apex of trochanter above Nélaton's line.	Below or even with Nélaton's line.
No permanent contractions of muscles.	Permanent contraction of flexors and adductors.
Pelvis square.	Pelvis raised and oblique.
Walks with healthy leg bent.	Healthy leg straight.
Touches ground with almost entire sole.	Only with the ball of the foot.
Spine straight.	Spine flexed laterally and anteriorly.
Angle of inclination of pelvis unchanged.	Angle of inclination of pelvis increased.
FRACTURE AND DIASTASIS OF HEAD.	SECOND STAGE OF MORBUS COXAERIUS.
Produced suddenly.	Growing comparatively slowly.*
Eversion of limb.	Eversion and abduction of limb.
Shortening of limb.	Apparent elongation of limb.
Straight limb.	Flexed in hip and knee.
Loose articulation.	Fixed hip-joint
Straight pelvis.	Oblique pelvis.
Crepitus in early stage.	No crepitus.
Spine vertical.	Spine curved.
Shoulders square.	One shoulder higher.
Nélaton's test (apex of large trochanter above the line). ¹	Nélaton's test (trochanter below the line).

The *impacted fractures* are of course excluded in this collection of differential symptoms.

DIASTASIS OF THE HEAD OF THE FEMUR IS FREQUENTLY MISTAKEN FOR HIP-DISEASE, as in the case now before you.

This little girl was brought to me some time since, to be treated for hip-disease, but I became satisfied, upon careful examination, that she was not suffering from hip-disease, although she had been under treatment for that difficulty for a long time.

¹ Nélaton's test (or Roser's test) is made by drawing a cord from the tuberischii to the anterior superior spinous process of the ilium, which will generally pass at the *very apex* of the trochanter major; now, in fracture of the neck or in true luxation, the apex of the trochanter will be found above this line.

I was positive that there was no hip-disease in the case, and why? There was a large abscess upon the hip, and there was evidently some trouble in that region, upon which this abscess depended; consequently my examination was very much obscured by these attending conditions. But, upon close examination with reference to the beginning of the difficulty, I found that the accident which had occurred to this little girl had been followed *immediately* by shortening of the limb without going through the stages of abduction, eversion, and effusion of the second stage of hip-disease, and then the adduction and shortening of the third stage, which necessarily must have taken place had the case been one of hip-joint disease.

In diastasis there may be adduction but not inversion, but these are invariably present in the third stage of hip-disease, except in extraordinary cases already mentioned. (See symptoms of third stage hip-disease.)

Again, when I applied Nélaton's test, which consists in drawing a line from the tuberosity of the ischium to the anterior superior spinous process of the ilium, the trochanter major was found *above* that line, which proved conclusively that there was either a separation of the head from the shaft of the bone, or a luxation. But the ordinary symptoms of luxation, inversion of the foot, etc., when the head of the femur is upon the dorsum of the ilium, were absent, and there was nothing left to account for the symptoms except fracture, or what is its equivalent in the young subject, diastasis.

Again, in diastasis, after it has existed some time, concussion of the joint produces no pain, nor does crowding the head of the bone into the acetabulum by making pressure upon the great trochanter. The deformity which was present in the case was the result of an accident that had occurred two years before, and the abscess was caused by inflammation of the bursa over the great trochanter, and it was this abscess which had caused them to diagnosticate the case as one of diseased hip-joint. Diastasis had not been suspected, and, as the child moved about, the irritation set up caused the psoas magnus and iliacus internus muscles to contract in such manner as to flex the thigh upon the trunk, and on this account the case was mistaken for one of hip-joint disease. But the flexion that takes place where diastasis occurs differs from that which results from disease in the joint. For, if the

joint contains more than its normal quantity of fluid, the flexion is *always* accompanied by abduction and eversion, and, when the capsule becomes ruptured and the fluid escapes, the flexion is *always* accompanied by adduction and inversion, unless there are adhesions.

In diastasis distortion is present, but it does not have that peculiarity which necessarily accompanies effusion.

This little fellow you here see is a very good illustration of



FIG. 211.

the deformity in cases of diastasis before any contraction of the muscles has produced flexion of the thigh upon the trunk.

CASE.—James H., three years of age; parents healthy; residing at 242 West Forty-seventh Street, New York. Child robust and strong.

When three months old the child was rolled out of a cradle, and the mother, catching it by the leg while falling, felt some-

thing snap. Nothing particular was noticed until about a week after, when the mother states the hip looked somewhat swollen. He was taken to a physician, who said it was a simple sprain, and ordered soap-liniment, which was applied for eighteen months, with a bandage. He was then taken to St. Luke's Hospital, where it was pronounced hip-disease, and a weight and pulley was applied for six months, the child being constantly confined to the bed. No improvement occurring in his hip, and his general health becoming injured by confinement (his mother states that he is not so stout as when he went to the hospital), he was removed from St. Luke's and brought to Bellevue.

His present condition is, as you see, tolerably good, although, as the mother says, he is not so fleshy as six months ago. The limb, as you observe, is shortened, *adducted*, and the foot very strongly *everted*. (See Fig. 211, from a photograph by Mason.) In fact, you see it can be rotated completely around, so as to bring the toes behind. There is no pain on pressure in the axis of the limb, or over the trochanter; consequently there cannot be inflammation *within* the hip-joint. There is very slight pain upon extreme rotation of the limb. In drawing a string from the tuberosity of the ischium to the anterior superior spinous process of the ilium (Nélaton's test), you observe that the top of the trochanter is above that line.

Our diagnosis in this case is, therefore, *diastasis*, and not hip-disease, and that the separation, or fracture, if you choose to call it such, occurred at the time the mother seized it by the leg to prevent its falling when it was three months old.

TREATMENT.—We shall put the extension-splint upon him, the same as if he had hip-disease, and thus prevent further contraction and deformity, and to take the weight of the body on the perinæum, allow free motion to the parts, and thus aid in the formation of a new joint on the dorsum of the ilium.

CASE. *Diastasis of the Head of the Femur*.—E. M. J., female, aged four years, was brought to me on January 5, 1873, with the following history:

On Christmas, 1870, being then twenty months old, and a very active, robust child, and having walked for six months, was left by her mother for about two hours in charge of the nurse. On her return the child was found lame in the left leg, which was shortened and slightly turned out, and has not been able to walk

upon it or touch the floor since. The nurse insisted with great positiveness that she had received no fall or other accident during the mother's absence, and that she had not been out of her sight a single moment. The child being too young to contradict this statement, it has to be received for what it is worth.

As the parents were then living in London, the child was carried to the different hospitals, according to the mother's statement, and examined by various surgeons, who pronounced it a case of hip-disease, and advised leeching, blistering, and rest. The limb gradually contracted, adducted, and rotated, until in the course of a year it assumed its present condition (as seen in Figs. 212 and 213, from photographs by O'Neil), which it has retained until the present time.



FIG. 212.



FIG. 213.

The parents came to America in 1872. The child was taken to two of the public institutions of this city, where the trouble was pronounced to be hip-disease far advanced in the third stage. She was then sent to me to have exsection performed.

Upon examination I found her to be a very robust and remarkably healthy child, and born of healthy parents. Upon stripping the child and laying her upon the floor upon her back so

that the spinous processes would touch the surface, while at the same time a line drawn from the centre of the sternum over the umbilicus to the centre of the symphysis pubis was crossed at a right angle by a line drawn from the anterior superior spinous process of one ilium to that of the other. In this position, the pelvis and trunk being held in their normal relations, the right thigh could be extended straight with the body until the popliteal space touched the floor, while the left was standing at a right angle with the body, slightly adducted and rotated outward nearly one-half upon its axis, so that the heel was pointing in a line over the right shoulder, and the foot in the opposite direction, as seen in Fig. 213.

In this position the limb was fixed and apparently ankylosed. There was no pain or tenderness around the joint upon the most severe pressure, and the mother said that there had not been for a year past. The child would bump herself along the floor upon her bottom and the foot of the well limb, as fast as most children would creep, her arms being used as crutches, and this was her mode of locomotion. When standing up the thigh was at a right angle with the pelvis, adducted across the upper third of the opposite thigh. The back was strongly curved at the sacro-lumbar junction, but not sufficiently to enable the foot to touch the floor. (See Fig. 212.)

There has been no suppuration about the joint, abscesses, or other evidences of carious disease of this articulation. The prominence in the gluteal region which had been mistaken for an abscess was caused by the trochanter major, which upon examination was found an inch above the line of Nélaton's test, indicating that there was either a fracture or luxation. The outward rotation of the foot contra-indicated luxation on the dorsum of the ilium, and there was therefore nothing left in the diagnosis but fracture through the neck, or its equivalent in a young subject, *diastasis*, or separation of the head from the neck at its epiphyseal junction.

The suddenness of the occurrence, the entire history of the case, and its present condition, confirmed this opinion. The child was placed under chloroform, and with some force limited movements could be obtained, showing that ankylosis had not occurred.

A pair of wire breeches were ordered for her; and on January 22, 1873, at Bellevue Hospital, in the presence of the class, I put

her under chloroform, and subcutaneously divided the adductor longus, gracilis, and tensor vaginae femoris muscles, closed the wounds with adhesive plaster, and with some little force broke up the adhesions, and brought the limb parallel with the other and nearly of the same length. She was then placed in the "wire cuirass," which had been well padded, the well limb straightened so as to bring the foot firmly against the foot-piece, while the anus had been secured in its proper place for defecation. This limb was then secured by a roller from the foot up, with a piece of pasteboard over the leg and thigh, to keep the knee from bending, so as to make that limb a solid column against the foot-board for counter-extension.

The deformed limb was dressed by placing strips of adhesive plaster on each side from just above the ankle to the middle of the thigh, and secured by a well-adjusted roller from the foot up, leaving a few inches of the plaster on either side of the lower extremity, to be pinned around the foot-board, which latter had been



FIG. 214.

screwed up to meet the shortened limb. A few turns of the screw readily brought the limb down to the desired length, and it was secured to the other leg of the wire cuirass by a roller, and the dressing was complete, as seen in Fig. 214.



FIG. 215.

She was sent home to her boarding-house in a little hand-carriage, and went out riding every day, notwithstanding the inclement weather, without the slightest inconvenience. She returned to the hospital on January 29th. The wounds had entirely healed without suppuration, only a very slight ecchymosis existing around the puncture over the tensor vaginae femoris. She was redressed completely, with the exception of the plasters upon the extended limb, the limbs washed, passive movements given to all the joints, and replaced in the wire cuirass for another week.

February 4th.—Applied long extension-splint with abduction-screw, when she was able to walk with the assistance of a cane. The limb could be extended to very nearly the normal length.

She wore the extension-splint for nearly fourteen months, when she had entirely recovered with scarcely a half-inch shortening of the limb, which was easily rectified by increasing the heel of her shoe, and the motions of her hip-joint so nearly perfect as not to attract attention.

Fig. 215, from a photograph taken eighteen months after the operation, shows her present condition. This photograph was taken at Poughkeepsie, her present residence, and the operator had made the focus such as to represent her as much smaller than in the other pictures taken eighteen months before, but Mr. Bross has preferred to copy it exactly, rather than to enlarge it to correspond with the others.

Here is a specimen (Fig. 216) which illustrates most beautifully what takes place in the disease or accident we are now considering, both in the change in the original acetabulum, which is nearly obliterated, and also in the formation of a new joint upon the dorsum of the ilium, which is almost as perfect in form as the original acetabulum.

The little fellow from whom this ilium was removed was brought to me in 1860 by his physician, for the purpose of having his hip-joint exsected, as he was supposed to be suffering from disease of that articulation in its advanced third stage. He was then six years of age, and presented a most singular deformity, different from any I had ever seen at that time.

He was quite a robust and healthy-looking boy, without the haggard and cachectic look of most cases of advanced hip-disease, and I was therefore led to scrutinize him with more than ordinary care. His thigh was flexed at nearly a right angle with the pelvis,

and adducted across the median line, and fixed in this position; but the foot was most strangely everted and rotated outward, so that the heel presented in front. His position was very similar to that in Figs. 212 and 213. There was no pain or tenderness upon pressure, and to my mind there were none of the indications of hip-joint disease present.

The physician who brought him to me had only seen him a short time before, and knew nothing of his previous history, but



FIG. 216.

supposed it to be a case of advanced hip-disease on account of the deformity and his inability to move the limb, although he had never carefully examined him.

Upon making careful inquiry of his parents and the physician who had first seen him, I learned that he had fallen down the cellar-stairs two years before (when he was four years old), and that when the doctor saw him, on the following day, his foot was already turned *outward* and his leg *shortened* and adducted, very similar to Fig. 211, and he considered it a case of fracture or diastasis of the head of the femur.

The child suffered so little that the parents were inclined to doubt the correctness of the doctor's diagnosis, and dismissed him. Another physician was called in, who pronounced it to be a simple sprain, and that it was of no importance.

The child began to hop around in a few weeks, but could never bear any weight upon the foot. In a few months the thigh

began to draw up, and finally became fixed in its deformed position, about one year before he was brought to me.

Having obtained this information of its early history, the case was clear, and the diagnosis easy, namely, diastasis, with resultant muscular contractions and fibrous ankylosis.

The treatment was, to divide the contracted tendons and bring the limb into the straight position by force. When the wounds caused by the tenotomy had healed, a long splint was applied, which he wore for about two years, and finally recovered with almost as complete motion as in the normal joint. The boy died of double pneumonia in 1868, and the attending physician was kind enough to allow me to make a *post-mortem* examination, when the specimen (Fig. 216) was obtained.

We have here a natural ilium, and upon it an irregular acetabulum, *B*, triangular in shape, in which what is left of the old head of the femur remains. Just below this point, upon the plane of the ischium, there is a little round facet, *A*, something like the facet upon the vertebræ for articulation with the head of the ribs, which is the point where the end of the femur rested before I saw him, and when the leg was flexed at nearly a right angle with the body. By cutting the tendons and allowing the limb to come down, and by the use of the instrument, eventually a new acetabulum, *C*, was made, which is upon the dorsum of the ilium, and has a crescentic edge so as to make a more perfect shoulder for the femur to rest against.

This new acetabulum, when rubbed with another piece of bone, gives the same feeling as when this is done with two pieces of ivory rubbed together. It is exactly such a sensation as is felt when the femur is moved in the acetabulum of the little patient who has just gone out.

This acetabulum was surrounded by a new capsular ligament, and the new formation performed all the functions of a normal joint, although there were no articular cartilages, synovial membrane or ligamentum teres. So far as usefulness was concerned it was just as good as a normal joint, being a perfect specimen of eburation.

The treatment which I adopted in all these cases was, first to divide such tendons and fasciæ as were necessary to permit the limb to be brought into the straight position, and then apply an instrument which is a modification of Taylor's long splint.

In the case of the little girl who has just gone out, the abducting and inverting screws were also necessary. (See Fig. 171.)

These instruments and their mode of application have already been described. (See lecture on Hip-disease.)

In those cases of diastasis, however, in which there is no contraction of the tendons, and the limb can be restored to its normal position, the long splint should be immediately applied, and worn until recovery has taken place. If you are called to attend the case immediately after the occurrence of the accident, treat it precisely as you would a case of fracture of the thigh, and place the patient at once in the wire cuirass, plaster-of-Paris dressing, or other apparatus, which will hold the parts perfectly quiet. I prefer the wire cuirass, especially for small children.

LECTURE XXV.

DISEASES AND DEFORMITIES OF THE SPINE.—POTT'S DISEASE, OR ANGULAR CURVATURE.

Definition.—Anatomy of the Spinal Column.—Etiology.—Pathology.—Symptoms.—Method of examining the Case.—Treatment.—Mechanical Appliances.—Plaster-of-Paris Jacket.

GENTLEMEN: To-day we have to speak of deformities of the spine, and of the diseases which produce them by affecting the bony structure. Deformities of the spine may be a consequence of disease either of the bones and cartilages, or the result of irregular muscular contraction, and the important point in their study is, to arrive at the pathological changes that have given rise to them.

Of these deformities there are two: 1. The one known by the name of Pott's disease, or posterior angular curvature, in which there is destructive inflammation of the bones, accompanied with loss of substance in the bodies of the vertebræ and intervertebral disks; 2. The deformity known as rotary lateral curvature of the spine, in which there is no disease of the bones, but the distortion depending entirely upon irregular muscular contraction.

The one is distortion, the result of destructive inflammation of the bones and intervertebral substance; the other is distortion dependent upon irregular, abnormal muscular contraction. Sometimes the distortion produced by this action of the muscles very closely approaches in degree and appearance that present when the bones and cartilages are diseased, and is then occasionally mistaken for Pott's disease. (See Fig. 230.)

The posterior angular curvature, or Pott's disease, will first engage our attention. You will recollect that the spinal column is made up of twenty-four bones and twenty-three intervertebral cartilages, independent of the sacrum and coccyx. The bones or vertebræ are made up of a body, processes, etc., which in early life are separate, being developed from distinct points of ossification; and complete fusion does not take place until life has become considerably advanced. The bodies of the vertebræ have a soft spongy texture, while the processes and articulating facets are more dense and firm. The bodies, being spongy, are much lighter and are much less frequently fractured than bones of denser structure; they are also much better adapted to receiving concussion without injury. At the same time the force of concussion is broken by the intervening cartilages, which are also spongy and elastic, and in this manner shocks are dissipated which would otherwise be transmitted to the brain, when a person comes down firmly upon the pelvis or feet. The intervening cartilages are like the rubber buffers under the railway-cars, and are so elastic that when pressure is removed from them they will return to their original dimensions. This is a practical fact that can be demonstrated by measuring a man in the morning before he gets up and again at night after he has been upon his feet all day; when it will be found that he has shortened from one-fourth to one-half an inch, which loss will be restored when he has had a certain number of hours' rest in the horizontal position. Now, there is a disease that occurs in the vertebral column which is called Pott's disease. It may occur at any period of life, but is much more likely to occur in childhood, and especially in those children who are reckless and careless, and expose themselves to all sorts of accidents. It also occurs more frequently among boys than among girls, because they are more exposed to accidents; whereas the lateral curvature is seen more frequently among girls. With regard to this affection, I have arrived at the conclusion,