Morbus Coxarius / by Lewis A. Sayre.

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Clinical Lecture.

Reprinted from the American Medical Times, June 29, 1861.

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Objections to its Treatment in the Advanced Stages by Extension, unless preceded by Tenotomy.

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ILLUSTRATED BY CASES.

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LEWIS A. SAYRE, M.D.,

SURGEON TO BELLEVUE HOSPITAL, AND PROF. ORTHOPŒDIC SURGERY IN BELLEVUE HOSPITAL MEDICAL COLLEGE.

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CLINICAL LECTURE

ON

MORBUS COXARIUS.

DELIVERED AT BELLEVUE HOSPITAL, DEC. 19, 1860.

BY L. A. SAYRE, M.D.

Reprinted from the AMERICAN MEDICAL TIMES, June 29, 1861.

IN compliance with the request of a number of the students of this Hospital, I shall offer a few remarks this afternoon in connexion with that diseased condition of the hip-joint, known as morbus coxarius, a disease the pathology and treatment of which at the present time are eliciting unusual interest in the professional mind. But before I enter upon a description of this disease, with the treatment adapted to its varied stages, allow me to lay before you, in brief, the anatomy of the hip-joint.

The articulation of the head of the femur with the acetabulum, is, as you all know, of the enarthrodial variety—the ball and socket joint. The ligaments of this joint are five in number, namely, the capsular, a firm ligamentous membrane, embracing the acetabulum superiorly, and the neck of the femur inferiorly; the ilio-femoral, a strong fibrous band, which arises from the anterior inferior spinous process of the ilium, and is attached to the anterior intertrochanteric line of the femur, adding strength to the anterior surface of the capsular ligament; the cotyloid, a fibro-cartilaginous band that completes the circle of the acetabulum, rising above its margin, and thereby increasing its cavity;—the transverse, a name applied to that portion of the cotyloid which bridges across and converts into a foramen the notch of the acetabulum, through which pass the articular vessels and nerve; and the ligamentum teres, a small, round ligament, connecting loosely the head of the femur with the inferior margin of

the acetabulum. I say loosely, because it evidently serves more as a means of support to the interarticular vessels than as a ligament proper to the joint. The head of the femur and the cotyloid cavity are covered with a cartilage of incrustation, except at those points that give attachment to the ligamentum teres, and at a small depression in the cotyloid cavity, which contains sebaceous matter, and is known as the fundus acetabuli.

This joint is provided with an extensive synovial membrane, which invests the head of the femur and the ligamentum teres, and is reflected upon the internal surface of the acetabulum and the capsular ligament. The hip-joint, in common with other joints of the body, is subject to a variety of pathological conditions; but I propose to confine my remarks at this time to that special, arthritic condition which is known, par excellence, as morbus coxarius. The nature and causes of this disease have been of late years a matter of much discussion with the profession, the great majority regarding the disease as connected by necessity with, and originating in, and from, the strumous diathesis; that scrofula and hereditary syphilis are the nidus whence this disease alone can arise. But this is a decidedly erroneous view of the truth; a view that is being rapidly dissipated by constantly developing facts. That morbus coxarius may arise in children whose constitutions have been vitiated by the sins of their ancestors, no one will attempt to deny; for such children are evidently more liable to the disease than those are who stand upon a firmer constitutional basis. But that morbus coxarius may arise in a child whose constitution is uncontaminated by hereditary taint, and who is perfectly healthy, the observations of every day fully substantiate. I believe that many have attributed the source of this disease to a strumous origin, simply from the *appearance* of the patient, whose emaciated spanæmic condition is regarded as the *cause*, when it is in reality the *result* of the disease. I have seen children of perfectly healthy constitutions, in whom the disease arose from an evident traumatic cause, so reduced in the course of a few months by the pain and sleeplessness attending the disease, as to present in a very marked degree, appearances which strongly simulate the strumous cachexia. And I have seen robust health and the ruddy cheek restored to these same children by timely surgical aid, together with proper constitutional treatment.

The immediate exciting causes of this disease are numerous and varied, being in some slight and but faintly marked; in others, well marked and palpably evident. While in some, whose constitutions are delicate, the disease will frequently arise merely from exposure after violent exercise; such exposure, for instance, as sitting upon the damp ground or a cold stone, when in a state of heated perspiration : in others, whose constitutions possess more of the resisting *vis naturæ*, it requires the infliction of some direct traumatic violence to the part, such as a wrench, or a fall, etc. What I wish to establish, is this—that, although the disease in different individuals arises from very different causes, *yet it never arises in any individual from a purely idiopathic or constitutional cause.* Morbus coxarius may be divided, for the sake of convenience of description, into three stages, each of which is characterized by its own distinctive symptoms.

First Stage.—The symptoms in the earlier part of this stage are often very feebly pronounced; more especially is this the case when the inflammatory action going on in the joint is of that low, sub-acute, asthenic character so frequently observed in persons of the strumous habit. They are sometimes referred to the knee and not to the hip, a fact that not infrequently has misled the unwary examiner, and, as a consequence, caused the infliction of the most unmerited abuse upon the knee, in the form of blisters, setons, etc. The child will limp when he attempts to walk, and when standing will rest the weight of his body upon the well limb, the diseased one being thrown forwards; the flexion of the diseased joint when compared with that of the well one, is limited. This difference in the flexibility of the joints is almost diagnostic of the disease. Pressure applied to the limb at any point, in such a manner as to bring the head of the femur forcibly into the acetabulum, produces pain, which pain is instantly relieved by the removal of this pressure. If a careful examination be made by pressure and extension, there will be no difficulty in making an accurate diagnosis; but if the ligaments are involved, as they sometimes are, in rheumatic inflammation, then *extension* increases the pain, and pressure relieves it. If, however, the synovial membrane, cartilage, or bones be involved, then pressure aggravates the pain intensely, and extension, gradual and constant, entirely relieves it. It is a remarkable fact that synovial membrane, in common with

all other serous membranes, possesses very little sensibility when in a state of health, yet when in a state of inflammation it is acutely sensitive.

Second Stage.—Should this inflammation progress unresisted, it will readily produce effusion within the capsular ligament, and which, if considerable, will occasion a peculiar deformity of the parts, namely, an *apparent* elongation of the limb; *eversion* and abduction; flattening of the nates, the rima natis on the diseased side being lower than on the sound side; flexion of the thigh upon the pelvis, and the leg slightly flexed upon the thigh. If the effusion be excessive or the inflammation acute, you will have an apparent anchylosis, caused by muscular contraction, which is an involuntary act produced by reflex action of the inflamed, irritated nerves, and is for the purpose of keeping the joint perfectly still. The flexor muscles of the thigh, the tensor vaginæ femoris, the pectineus and rectus femoris are so firmly contracted that the whole pelvis moves on the articulation of the opposite side. This rigidity does not depend upon true or bony anchylosis, for by division of the tendons of the contracted muscles or puncture of the joint, you will have free motion of the limb, showing that no bony adhesion existed.

Third Stage.—If the disease be not arrested, the acetabulum becomes perforated, or ulceration and rupture of the capsule take place; and the fluid, whether synovia, pus, or plastic lymph, becomes effused into the surrounding tissues, burrowing in various directions, and forming femoral abscesses. The peculiar change that takes place in many instances, upon the rupture of the capsule, in all the symptoms, and the suddenness of the occurrence, have led to the false idea that a luxation had taken place. When the capsule is thus ruptured, if no attachments have already occurred, the limb becomes *apparently* shorter, adducted, inverted, flexed in hip only, pelvis raised and projected backwards. In fact, the position is almost the reverse of what it was in the second stage. This change from the second to the third stage is *sudden* when the opening in the capsule is large, and allows of the rapid and total escape of its contents into the surrounding tissues; and *gradual*, if the opening is small and fissure-like. I have seen the former take place in a night, and the latter require weeks to accomplish the change. There are extreme cases, in which this change may not take place, although the effusion

may have escaped from the joint. Such cases are those in which the head of the femur has broken through the acetabulum, by which it is held firmly in its place. I will take the trouble, even at the expense of being considered tautological, of arranging side by side, for more easy reference, the symptoms of the two last stages of the disease.

Second Stage.	*Third Stage.*
Limb (apparently) longer.	Limb (apparently) shorter.
" abducted.	" adducted.
" everted.	" inverted.
" flexed in both joints.	" flexed in hip-joint only.
Foot touches the ground with sole.	Foot touches with ball only.
Toes everted as in fracture of neck.	Toes inverted as in post. sup. luxation.
Pelvis lowered on diseased side.	Pelvis raised.
" projected forward.	" projected backward.
" angle of inclination acute.	" angle of inclination almost right.
Nates low and flat.	Nates high and round.
Linea inter nates inclined towards affected side.	Linea inter nates deviates from affected side.
Pain most intense.	Pain greatly diminished.

Diagnosis.—Morbus coxarius may be confounded with sacro-iliac disease. In the first and second stages of coxalgia we may have elongation of the limb; this always occurs in sacro-iliac disease; but in coxalgia the elongation is discovered by measurement from the anterior-superior spinous process of the ilium, to the internal malleolus, the elongation being caused by effusion into the hip-joint. If the disease is between the sacrum and ilium, this measurement between the malleoli and superior spines of either side will be equal, and the elongation will be found to be dependent on the displacement of the diseased ilium itself, which is tilted forwards, and rotated or slipped downwards, owing to the swelling and destruction in the affected articulation. The anterior spine is not only lower down than its fellow of the opposite side, but is pushed forward, and is much more prominent; and this is not produced by any obliquity of the pelvis consequent on a twist of the spine, as in hip disease, but by the tilting forwards and rotation

downwards of the whole of the diseased side of the pelvis. The seat of pain is also different in the two diseases. In hip disease it is most acute when pressure is applied firmly above and behind the trochanter major, or when compression is exercised against the anterior part of the hip-joint through the pectineus muscle. In sacro-iliac disease little or no pain is experienced when pressure is made in these situations; but tenderness is elicited by pressure upon the sacrum, and along the line of the sacro-iliac synchondrosis, behind and altogether away from the hip-joint. The movements also which occasion pain in the two diseases are entirely different. In hip disease, abduction or rotation outwards aggravates to a greater or less degree, often to an intolerable extent, the sufferings of the patient; but in sacro-iliac disease the thigh may be moved in all directions, abducted, adducted, rotated, flexed, or extended, when the patient is on his back, without any increase of pain, *provided the side of the pelvis be immovably fixed by an assistant at the time.* Should this precaution of holding the pelvis immovable not be observed, the movements of the thigh will be communicated to the diseased articulation of the ilium and sacrum, and necessarily occasion suffering.

For a differential diagnosis of most of the other diseases with which morbus coxarius may be confounded, the following table may be consulted with advantage:—

FRACTURE AND DISTASIS OF HEAD.	SECOND STAGE OF MORBUS COXARIUS.
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.	No crepitus.
Spine vertical.	Spine curved.
Shoulders square.	One shoulder higher.
Nélaton's test (apex of large trochanter above the line).*	Nélaton's test (trochanter below the line.)

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

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* Nélaton's test is made by drawing a cord from the tuber-ischii to the 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.

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.	" "
Immobility of articulation.	" "
Flexion of the hip.	" "
Moderate shortening.	Apparent shortening considerable.
Head usually felt under glutæus maximus.	Head not felt at all.
Apex of trochanter above Nélaton's line.	Below or even with Nélaton's line.
No stationary 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.

POTT'S DISEASE AND PSOAS ABSCESS.	THIRD STAGE OF MORBUS COXARIUS.
Preceding pain in the *spine*.	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.

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.

Treatment.—Until within the last few years, little had been done by surgeons in the treatment of this disease. It was customary to leave it to the vis medicatrix naturæ, a force that was sometimes found so conservative as to save the life of the patient, preserving for him a withered, malformed, anchylosed limb, specimens of which we have doubtless all seen. It was an opinion entertained by some surgeons of respectable position, that if the bones of the joint are involved in caries, there is little or no hope for the patient. Even so high an authority as Mr. Syme, asserted that if the head of the femur be carious (which implied, in his estimation, a carious condition necessarily of the acetabulum), the patient *must die!* But it affords me great pleasure, gentlemen, to be able to-day to disprove in the most unanswerable manner, that broad assertion of Mr. Syme. And this pleasure does not arise from a consideration of being able to point out the errors and refute the statements of so deservedly great a man as Mr. Syme, but rather from the fact that I am able to give you such tangible, such cheering evidence of the progress of conservative surgery.

Treatment in First Stage.—In the treatment of this disease in its first stage, local depletion by cups or leeches is often necessary, with a relaxed condition of the bowels. But the most important of all, and on which all prospect of success will depend, is rest of the joint and perfect freedom from pressure of the inflamed synovial surfaces, together with such constitutional remedies and general support of the system as may be requisite in each particular case. Having subdued the inflammation in the joint by the means indicated, the child is placed in bed and subjected to the effect of extension in the manner in which I shall point out. Two pieces of strong adhesive straps are placed along the sides of the limb for nearly its whole length. These

straps are held firmly in place by two additional straps going spirally around the limb, and a roller bandage extending from the toes to the pelvis. To the lower end of these lateral straps are sewed two pieces of narrow webbing, which are united below the foot. To this webbing is attached a cord running over a small pulley at the foot of the bed, and supporting a weight of from four to ten pounds. The weight at the foot of the bed acts as the extending, and the body of the child as the counter-extending force. And in this manner, pressure is entirely removed from the inflamed articular surfaces. This mode of extension is employed during the night only; during the day the child wears a splint, which is so constructed as to effect both extension and counter-extension, and at the same time allow the patient to take exercise in the open air.

The first person to construct a splint embracing these principles was Dr. Davis, of this city, which splint I here show you. It consists, as you see, of a steel bar extending from the crest of the ilium to near the ankle, with a hinge joint near its lower extremity, at its upper extremity having an eye through which plays a catgut, that is secured to the perineal band, thus making the counter-extension. The plaster before described, terminating in the webbing, is secured to the buckle at the lower extremity of the instrument, while bent at an angle. The instrument is then straightened at the hinge joint, by which means the extension is produced, and locked, by means of a slide, which retains it in this position. The objections to Dr. Davis's splint are, the extension is not made until the instrument is brought perfectly straight, when it may be so severe as to produce excoriation of the groin, or not of sufficient power to relieve the joint from pressure. I have therefore constructed an instrument embracing the same principles, but the power is applied either by a screw, or a ratchet and cog wheel, by means of which extension may be graduated with much greater facility, by simply turning a screw, and can be increased or diminished, according to the requirements in the case, without removing the instrument. In addition to this, the pulley and ball and socket placed at the upper extremity of my instrument afford greater facility for motion, without destroying the cord playing through it. The perineal band is a strong India-rubber tubular cushion, and therefore not so likely to excoriate the parts as the flat webbing of Dr. Davis's instrument. As to the

relative merits of the two instruments, it is not for me to judge; the profession will of course select according to their particular preferences. I deem these remarks necessary in order that the profession may not confound the two instruments, as they would be led to do by the remarks of Dr. A. C. Post, made in his clinical lecture, and contained in the Medical Times of December 15th, in which he says, "some modifications and improvements have been made in this splint (referring to Davis's) by Dr. L. A. Sayre, and among some it is known as Sayre's splint;" thereby confounding the one instrument with the other, and thus misleading the profession. I have therefore taken this opportunity of showing you the two instruments, in order that you may observe the essential differences between them, by which you will see that they are two perfectly distinct instruments, although both intended to accomplish the same object. I simply request that you will not confound the one with the other, as I have never made any claim to Dr. Davis's instrument.

[Dr. Sayre then exhibited one of his own splints, as well as one of Dr. Davis's, and showed the method of their application and working.]

I have recently constructed another instrument, which I regard as a very decided improvement upon the splints I have just shown you (see Fig. 1). The principle of extension and counter-extension embraced in it is identical with that of the original splint, with this improvement, that the extension is made from above the knee instead of below it, leaving the motion of the knee-joint entirely free. This is accomplishing a desirable object, and I now employ this instrument in every instance where it can be used. There are cases, however, in which it cannot be used, as for instance in a very young child whose thigh is too short to afford sufficient surface for the attachment of adhesive plaster: nor can it be used in a case where fistulous openings are so numerous and so situated as to present the same obstacle. In these cases the original long splint is employed (see Fig. 2).

Treatment in the Second Stage.—The treatment in this stage of the disease must depend upon the condition of the joint. If the disease is of a subacute character, and the quantity of effusion small, the treatment that has been advised for the first stage may prove entirely successful in the second.

To facilitate the absorption of the effused matter, it is often advisable to strap the joint firmly with adhesive plaster.

Fig. 1

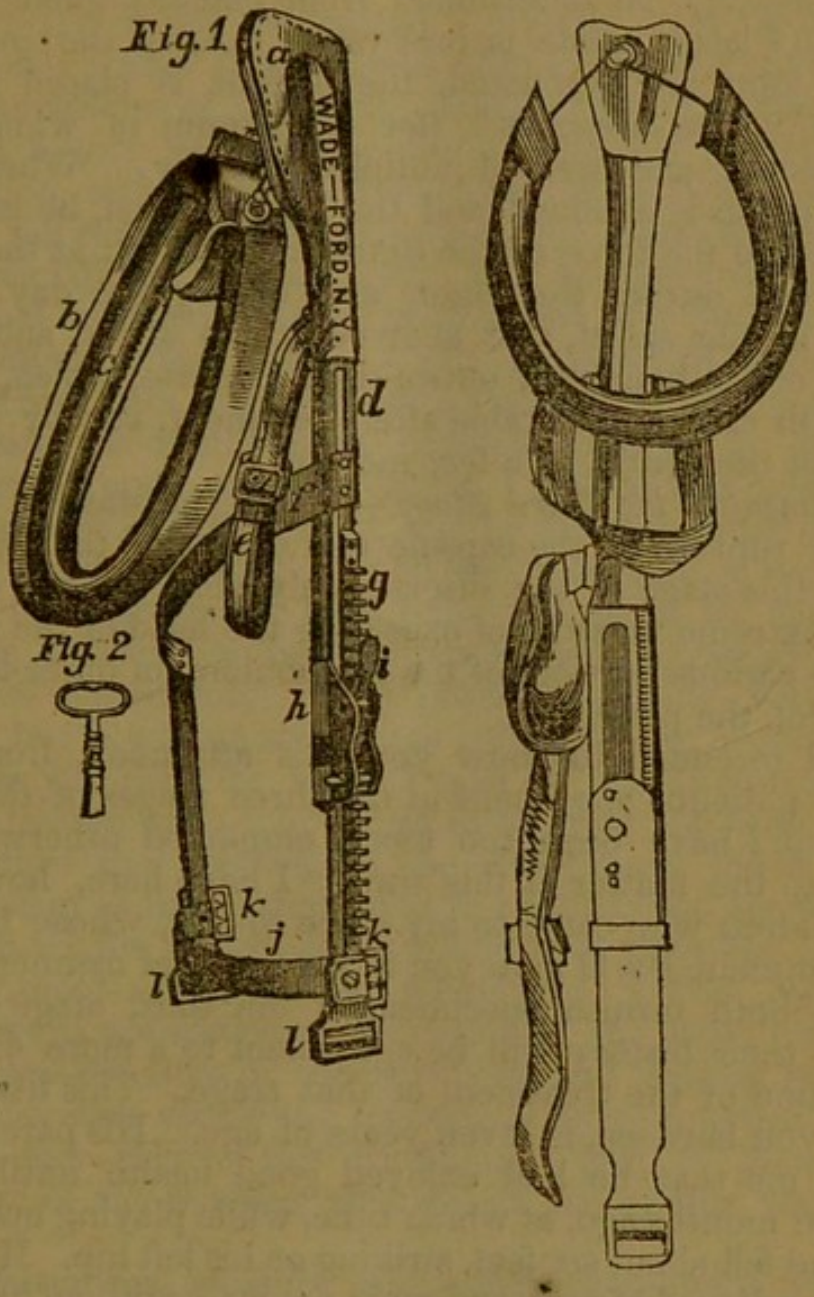


Fig. 2

But if the inflammation is acute, the effusion abundant, the malposition of the parts extensive, and pain excessive, the prompt removal of the morbid contents from the joints for the division of the contracted muscles becomes absolutely necessary, and never fails to afford immediate relief of all the most prominent symptoms, and to restore rest and comfort to the patient. In fact, it is the only anodyne that will assuage the pain. There are two ways of performing this operation, viz. puncture with the trocar, and

free incision with the knife. If the effusion is serous, the former method is advised; if it is purulent, which may generally be determined from constitutional symptoms, the latter mode is preferable. After the contents of the joint are evacuated, the patient is placed in Dr. Bauer's "wire breeches" (for a diagram of which see my report), and treated antiphlogistically. When the inflammation is subdued and the parts healed, he is again subjected to the force of the extending weight at the foot of the bed during the night, and during the day he is placed in the splint, and allowed to go about, and avail himself of the benefit of out-of-door exercise, which, together with care and suitable after treatment, usually effects a cure in the course of a few months.

Treatment in the Third Stage.—This is the stage in which we find rupture of the capsule and escape of the effusion. It is in this stage of the disease, only, that we are driven to the extreme measure of exsecting the head of the femur, and the carious portions of the acetabulum, in order to save the life of the patient.

I had intended to show you, this afternoon, from my private patients, specimens in the three stages of the disease, but I have been too much employed otherwise to attend to the matter at this time. I have here, however, two children who came to my office to-day, whose history and treatment I will give you in a very brief manner; and as they both furnish specimens of the third stage of the disease, their history will be equivalent to a more didactic description of the treatment of that stage. This little boy whom you here see, is seven years of age. His parents informed me that he had enjoyed good health until some eighteen months ago, at which time, while playing upon the stairs, he fell about six feet, striking on his left hip. He soon after complained of pain, and could not walk without limping. A physician at that time being called, ordered a liniment to the part, which was applied, but did not alleviate the pain; and he could not walk without enduring much suffering. Some ten months ago he met with another fall, inflicting a second injury on the same hip; whereupon the symptoms of morbus coxarius became more aggravated. Some time after this last injury, the patient was placed under my care. This patient is evidently of a scrofulous habit, and his condition, at the time of which I speak, was truly pitiable. He was suffering from hectic, and was extremely emaci-

ated. Extensive abscesses existed in the external portion of the thigh, which I opened, giving exit to a large quantity of flaky, strumous pus. The tensor vaginæ femoris muscle being firmly contracted, I divided its tendon subcutaneously; after which I was able to make a more perfect examination of the joint; in which examination I discovered a sort of subcrepitus, a kind of cartilaginous crepitation, which furnished evidence of considerable erosion of the cartilage of incrustation, and disorganization of the articulation. But as there was no bony crepitus, I concluded to attempt a cure in this case without resorting to exsection of the bone. I put this patient upon cod-liver oil and iron, together with the most nutritious diet, and made use of my splint, ordering him to be kept as much in the open air as possible. Under this treatment the abscesses readily healed, and he has continued gradually to improve, until, as you see to-day, he walks with ease in the instrument, feels quite free from all pain, and presents a tolerably healthy appearance, considering his strumous disposition. This patient is doing very well indeed, but it will be some time before he can abandon the splint, as you perceive when I take off the extension, and make pressure upon the heel so as to bring the head of the femur into the acetabulum, he experiences much pain; but as soon as the extension is re-applied, you see that he can support the weight of his whole body upon the affected limb without any suffering whatever. I find, however, that there is not sufficient abduction of the limb, owing to the contracted state of the pectineus and gracilis muscles. I will therefore divide the tendons of these muscles, which will at once relieve this condition. (Dr. S. then made a section of the tendons, after which the motion was quite free.)

I take unusual pleasure, gentlemen, in showing you my second patient—this smiling little rosy-cheeked girl, who was brought quite unexpectedly to my office to-day, from her home in the country. I wish I had a daguerreotype of her when I first saw her last August, that I might show you the remarkable contrast between her present healthy, happy, cheerful condition, and her previous spanæmic, exhausted, woe-begone appearance.

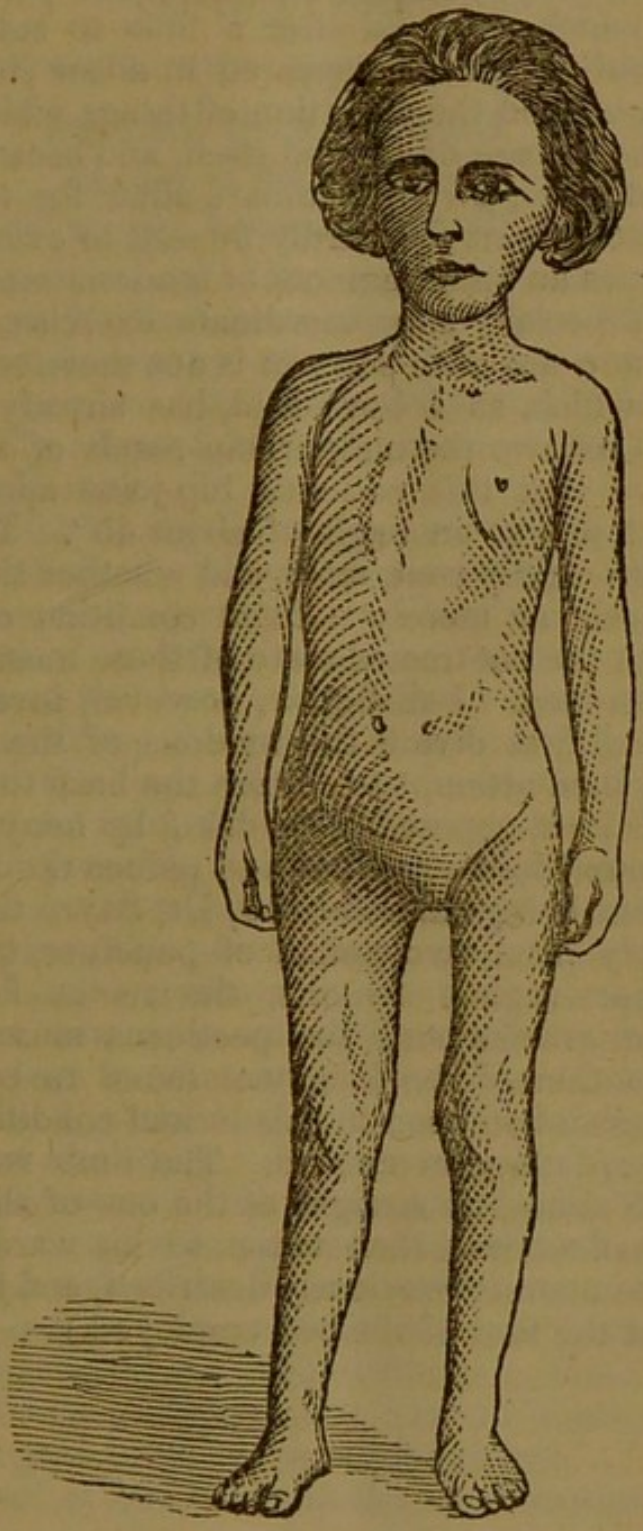
This little patient is seven years old. Her mother states that about a year and a half ago she was first observed to complain of pain in the knee, the pain not being referable to

any known cause; that this pain appeared for a number of months to vacillate, now apparently better, and then again worse; until it became finally so acute as to oblige her to remain in bed. When I saw her about the middle of last August, she had hectic fever, nocturnal sweats, no appetite, and was extremely emaciated. The thigh was strongly adducted, flexed upon the pelvis, and immovably fixed in this position. Opening at different points on the hip and thigh, were a number of sinuses discharging pus freely, and connecting with the joint. Upon a careful examination, I found the articulation extensively disorganized, and came at once to the conclusion that the course of treatment to be pursued in her case, and that which held out the greatest prospect of success, was exsection of the joint; which operation I performed early in September last. I found the condition of the joint such as to fully confirm my diagnosis.

I exsected the femur through the trochanter major, and removed such portions of the acetabulum as were found carious. The little patient was then put into the "wire breeches" previously referred to, and the wound dressed in such a manner as to favor granulation from the bottom. Her nights, previous to this operation, had been passed in sleeplessness and pain, but the first night after the operation, as well as the succeeding nights, she slept well without any anodyne. She remained under my care some seven weeks after the operation, during which time her improvement was marked and constant. At the expiration of this time her general health being much improved, I sent her home in the wire breeches. I have not seen her since that time until to-day. You observe that the two limbs are nearly or quite of the same length, while the motion of the mutilated joint is almost as perfect as that of the other. No one can determine from the appearance of the two limbs which is the imperfect one. The matter that has been thrown out with the design of subserving ultimately the purposes of the normal bone, is yet pliant, and the joint therefore requires mechanical support, until this matter shall have assumed its firm fibrous or semi-osseous nature. And as no mechanical contrivance has yet been devised which effects this object so perfectly as my own splint, we will employ that. (Dr. Sayre then put up the limb with the adhesive straps and roller, and applied the splint, after which the little patient walked about, and appeared very much pleased.)

This cut represents the case three months after the exsection of the head of the femur, and is engraved from a photograph taken by Gurney.

But we must not forget the cause that gave occasion for



the remarks which I have just made, namely: the patient upon whom I am now about to operate. The patient is a

young man, 23 years of age. When a boy he had what he calls "the white disease of the knee," with which he was laid up for a year or two, but eventually recovered the perfect use of the joint. Some years after this period, he had hip disease, which appeared after a time to subside spontaneously; but it again reappeared in a low chronic form, and finally produced the condition of things which we here observe. The disease exhausted itself, and became arrested in the second stage, a very fortunate affair for the patient. The disease at present can hardly be said to exist, although there is at times an undue amount of tenderness experienced in the joint, especially after inordinate exercise. The operation I am now about to perform is not therefore to relieve the disease, which, as I have said, has already subsided; but rather to remove the undesirable result of the disease. You perceive that this patient's hip-joint appears to be firmly anchylosed, at an angle of about 45°. The muscles of the part are rigidly contracted, and whether this is a true bony anchylosis, or merely a fixed condition of the joint resulting from the contracted state of these muscles, I have not yet determined. I shall now, however, investigate the matter. I shall first divide the tendons of the contracted muscles, and then attempt to restore the limb to its normal position. If I am opposed in so doing by bony adhesions, I shall break up those adhesions and reduce the limb.

(The patient being chloroformed, Dr. Sayre then divided subcutaneously from two points of puncture, the tendons of the tensor vaginæ femoris, the rectus femoris, the sartorius, the gracilis and the pectineus muscles. After which the motion of the joint was found to be tolerably good; although it had been in this locked condition for two years, no bony adhesion existed. The limb was brought down at once almost as straight as the one of the opposite side. The patient was then taken to his ward, the limb dressed in the manner previously described, and the extending weight at the foot of the bed employed.)

OBJECTIONS TO THE TREATMENT OF

MORBUS COXARIUS

IN ITS ADVANCED STAGES BY EXTENSION, UNLESS PRECEDED BY TENOTOMY.

ILLUSTRATED WITH CASES AND ILLUSTRATIONS.

By LEWIS A. SAYRE, M.D.,

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Since the publication of my report on morbus coxarius to the American Medical Association, in June, 1860, the treatment of this disease by *extension* has become almost universal, and the plan of treatment suggested in the Report has been partially adopted, not only in all parts of this country but also in Europe.

On page 23 of my Report, when speaking of muscular contraction, I state—"But this *constant muscular contraction* exhausts the nervous system and induces hectic fever, gives the child nocturnal spasms of intense agony, caused by pressure of the head of the femur against the acetabulum, and produces absorption of both bones, and prevents nutrition of the limb, which results in atrophy. I, therefore, resort to artificial means to produce this rest and remove the pressure, and *formerly* divided the firmly contracted muscles to prevent the head of the bone from being pressed against the acetabulum, and kept them at rest in the horizontal position in the 'wire breeches' of Dr. Bauer; but now accomplish the same result by gradual but permanent extension by the means of the instrument I have devised, with very much more satisfactory results, and without any danger of anchylosis, or by a weight and pulley as suggested by Sir Benjamin Brodie."*

A more extensive experience has satisfied me that in the advanced periods of the disease we cannot succeed without tenotomy, and as I am partially responsible for the present almost universal treatment by extension, it is due to myself as well as to the profession that I should clearly explain my views in regard to its therapeutical effects.

The object of extension in the inflammation of all joints

* Chelius' Surgery, edited by South, American reprint, page 296—also page 300.

is to relieve pressure from the inflamed synovial membrane and cartilage. In the earlier stages of the disease *extension* alone will accomplish this object; but in all inflamed joints reflex contractions soon take place, and the muscles become secondarily involved in the disease, and continue thus to complicate it to its termination.

The muscles, by being kept in a state of permanent contraction for a long time, become *contractured*, or structurally shortened, and in this state cannot be stretched or elongated by any amount of extension short of rupture.

On the contrary, any attempt at extension of a muscle in this condition only irritates it the more, and by persistence will produce chronic inflammation of its fibres, which if continued will always end in fatty infiltration and degeneration, after which it will never be restored to its natural contractility and elasticity. And the constitutional effects of a persistent attempt to extend an inflamed muscle are really as bad, if not worse than would be produced by the disease if left to the unaided efforts of nature.

If the object to be accomplished is to relieve the inflamed synovial membrane from pressure, it is obvious that it can be done by extension *only* when the muscles are in a condition to be *extended;* but if they have become structurally shortened and absolutely incapable of *any elongation*, it is equally obvious that no separation of the inflamed surfaces can take place without first making section of the *contractured** muscles. The test which I rely upon, for the necessity of tenotomy in these cases, is *Anæsthesia.* If when under the full influence of chloroform or ether the muscles relax, and the position can be improved, then gradual and continual extension will accomplish the object; if, on the contrary, the limb remains immovably fixed under the anæsthetic, then section is necessary.

In some instances the inflammation commences in the muscles, and the joint becomes secondarily involved: in these cases the views here expressed are of still greater importance, as extension will seriously aggravate all the symptoms, *rest* being absolutely requisite.

As I deem these views of vital importance in the treatment of chronic inflammation of *all joints*, and as I have seen a very large number of cases where the extension had

* I use the term *contracted* to express a shortened muscle, but which is still capable of being extended; and *contractured* when it has undergone *structural* shortening and is incapable of being elongated—similar to Barwell.

been continued for months without benefit, but great injury, and which have been instantly relieved by subcutaneous tenotomy, I will narrate one or two to illustrate the principle which I have endeavored to inculcate in this paper:—

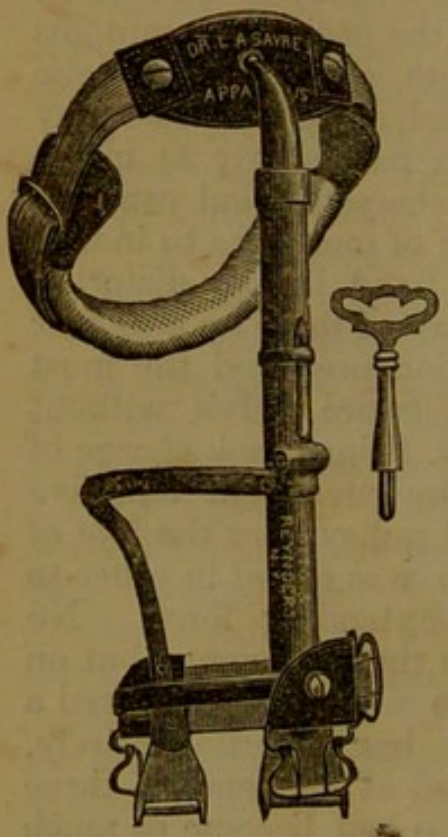
Case I.—C. Pernot, aged 8, 156 Stanton street, was brought to my office in August, 1862, suffering from hip disease in its second stage, the result of a fall received sixteen months previously. She had had all the ordinary symptoms of the disease in its progressive stages, and at the time she was carried to my office she was much emaciated, had very little appetite, suffered intense pain, particularly at night, which was of a sharp lancinating character, and came on by spasms, requiring a very free use of morphine to induce sleep. The limb was immovably fixed in the distorted position of the second stage, and retained there by muscular contraction. Any attempt at motion produced the most intense suffering, and moved the entire pelvis without giving any motion in the joint. Dr. Prince took charge of the case, and applied extension by means of adhesive plaster to the leg, and a weight and pulley over the foot of the bed, the lower portion of which was raised in order to make the body act as a counter-extending force. No benefit whatever was derived from the treatment; but on the contrary her pain became more severe, she required a more liberal use of morphine, lost her appetite entirely, became very greatly emaciated, and at the end of three months the constitutional symptoms had become so much aggravated that the Doctor requested me to see her with him. He had varied the weight at different times from one pound up to eight, but all to no purpose, and he became satisfied that the extension was of no use, but was doing her a very positive harm.

I saw her on the sixteenth of December, and found her much worse than when she was at my office in August; she was much more emaciated, exceedingly irritable, and the tenderness around the joint so great as to preclude all possibility of motion. The adductor muscles of the thigh, the tens. vag. femoris, rectus, and sartorius were very tensely contracted and firm. She was put under chloroform, and I divided them subcutaneously with an immediate improvement of the position, and quite free motion of the joint. No hæmorrhage followed the operation. The wounds were instantly closed by adhesive plaster, without the admission

of air; a cloth wet in cold water was applied and secured by a roller around the pelvis and thigh. One-fourth of the weight which had been formerly used was then applied to the foot, and she was left in the bed as before.

The next morning I called to see her, in company with Dr. Winslow Lewis, of Boston, and found her cheerful and happy, playing with her doll, entirely free from all pain, and had been so since the operation. She had taken no opiate, and yet had slept well all night without any spasms, which the mother stated was the first time she had slept well for many months.

Fig. 1.*



From this time all her symptoms improved rapidly, her appetite returned, her sleep was perfect, and all constitutional irritation subsided. The wounds all healed in a few days without suppuration, and at the end of fourteen days I applied my short splint for extension from the thigh, and she immediately began to walk about without pain.

In March last she walked from Stanton street to Bellevue Hospital to have her bandages re-applied, and was there exhibited to the students. The limb was nearly the same length as the other, and perfectly straight; the motions of the joint were free and without any pain, and her general health was good. When the instrument was properly adjusted she could bear her entire weight upon the diseased limb without pain, although when it was removed she could neither bear any weight upon it nor have it moved without great suffering. Of course many months will yet be required to effect a cure, but from the many similar cases that I have seen I am satisfied she will entirely recover, and with a useful joint.

Case II.—The following case is from the reports of Bellevue Hospital, and is reported by W. F. Peck, M.D., Senior Assist. to First Surgical Division :—

* The cut, Fig. 1, gives a very good representation of my hip splint, as manufactured by Messrs. Otto & Rynders, No. 58 Chatham st.

Sabina Donolson, æt. 6 years, is a well formed child, and had always been in the enjoyment of good health up to the commencement of her present trouble, which began August 1, 1861. Her mother states that she was standing on a table, when she accidentally received a fall which gave her some pain at the time. In a day or two after the accident she again engaged in her play as though nothing had happened, and continued to remain free from any unpleasant symptoms until early in October, when she was attacked with a severe pain in her knee, accompanying which there was a noticeable halting in her walk. Her mother thinks she observed this before the pain appeared. The pain, which was of a lancinating character, was most violent during the night. Her parents and others sleeping in adjoining rooms would frequently be disturbed with her justifiable shrieks.

About the middle of November she was admitted into St. Luke's Hospital, where she remained a little more than two months. Extension was kept up during the whole time, but without any benefit; on the contrary, all her symptoms were aggravated.

Fig. 2.

She was admitted into Bellevue Hospital Jan. 22, 1863, when the following symptoms were observable:—The right foot (see Fig. 2), when she stands erect, is elevated four inches from the floor, and very much adducted. The leg is flexed upon the thigh, and the thigh upon the hip. The pelvis is moderately distorted. When motion is attempted with the femur the whole pelvis moves as though bony anchylosis of hip-joint existed. She has constant pain at the hip-joint, which is most excruciating at night. When pressure is made it is increased. The leg is also much atrophied. Her appetite is fair, and diges-

tion good. Extension was applied for a few days, but seeing that no good result followed the treatment Dr. Sayre proceeded to operate (Jan. 29th) by subcutaneously dividing the gracilis, adductor magnus, longus, and brevis. The wound was immediately covered with adhesive plaster to prevent the introduction of air, and moderate extension applied to the parts. When comparing the length of the two legs the diseased one is found to be only an inch shorter than its fellow. Jan. 30.—The extension relieves her from all pain; before the operation it would have been torture to have kept it applied so continually. She eats and sleeps well. Feb. 2.—The wound made by the operation is now closed, consequently the straps are removed. As long as the extension is kept up she feels perfectly well, but when it is taken off and allowed to remain off her former pain shows itself. Her appetite and digestion are excellent. Feb. 16.—The extension has been continued since the operation without pain. Functions well performed. Dr. Sayre's splint was applied this afternoon, when she walked off with the aid of a crutch without difficulty. Discharged.

April 4.—The patient was brought to the hospital to-day to have her dressings re-applied, they not having been changed since she left the institution. The improvement which has taken place is most marked. Instead of the peevish, irritable disposition which she showed when first admitted she now presents a pleasant appearance, and has the glow of health on her cheeks. Her mother states that she has not even complained since she left the hospital. Her appearance and improved position are well represented in Fig. 3, from a photograph taken at that time.

Fig. 3.

Case III.—Jane S., of Chicago, aged 6, was perfectly healthy until four years of age. After running very severely two years ago she came to her mother complaining of very severe pain in her right hip. She was confined to her bed for some days, suffering great pain, and could not bear any movement of the limb. After a few weeks' perfect rest she got around, and walked well for some time.

About a month after she began to have pain at night, particularly in her knee. Dr. Brainard saw her and pronounced it hip-disease, and put her in a splint. Other physicians saw her, who disagreed with this diagnosis.

The disease continued to progress, and after one year she came to New York in 1862, and was placed under the care of Drs. Parker and Sands. They applied extension with a splint, which relieved her very much indeed, and in six or eight weeks she was so much better that they advised her to leave it off, and she returned home, as it was thought, cured.

After a few weeks of exercise with the joint unprotected by extension, she again began to complain of pain in the knee and hip, and in a very short time was much worse than at any other period of the disease. Extension was again applied, which so aggravated all her symptoms that the physician in attendance concluded it could not be a case of morbus coxarius; and after this there was great diversity of opinion, no two hardly agreeing in a diagnosis. She was again brought to New York in March, 1863, and placed under the care of Dr. Peaslee.

I saw her in consultation with Dr. Peaslee, and found her in the advanced period of the second stage of the disease—the thigh flexed on the pelvis, and leg on the thigh, limb everted, elongated, rotated outwards, and immovably fixed in this position. Any attempt to move it in any way caused intense suffering, showing that the anchylosis was from muscular contractions only. Extension could not be endured, and produced as much pain as pressure. The pelvis tilted forward, and the spine was much curved. Emaciation, loss of sleep and appetite, and all the other constitutional symptoms were such as we always find at this period of the disease.

On the 10th of March, 1863, assisted by Dr. Peaslee, I divided the adductors, the sartorius, tensor vaginæ femoris, and long head of the rectus femoris muscles sub-cuta-

neously, closing the wounds with adhesive plaster and a snugly applied roller.

She was under the full influence of chloroform during the operation, and before she had entirely recovered from the anæsthetic the limb gradually assumed its natural position *voluntarily*, without any manipulations with the hand whatever, done of course by the natural contractions of the remaining muscles, which were now left free to act. The pelvis became square, and the limbs of equal length; the curve in the spine was removed, and the anterior superior spinous processes of the ilium became parallel instead of oblique, as they were before the operation, the right one being more than an inch lower than the left. Upon taking hold of the limb all the movements of the hip-joint were perfectly free, and by a very slight extension could be produced without pain.

She was placed in bed with the weight and pulley as usual, and 2lbs. weight applied; this weight has been gradually increased to 5lbs. She slept perfectly quiet all night without any opiate, and has not taken a narcotic of any character whatever since. The wounds all healed in a few days without suppuration, and her general health improved so rapidly that when Dr. Peaslee saw her at the end of three weeks he was much surprised at her remarkable increase of flesh.

She has not lost a meal or a night's sleep since the operation, and in fact has not made a single complaint of any pain whatever, and is now running around with the instrument applied the same as the cases above reported.

My object in publishing this case is to show the importance of keeping on the instrument for a long time after all evidences of the disease have disappeared. In fact, then is the time that it is of the greatest good, as it admits of freedom of motion to the joint, while the child can take exercise in the open air for the purpose of invigorating the general health, and at the same time the joint is guarded from pressure, and thus secured against a relapse; and this should be continued for many months, or even a year or more after they are entirely well.

795 Broadway, April 10, 1868.