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REPRINTED FROM

The New York Medical Journal  
for January 31, 1885.





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## THE MANAGEMENT OF THE ABSCESSSES OF HIP DISEASE.\*

BY A. B. JUDSON, M. D.,

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THE present paper is founded on the study of a number of cases of hip disease in which the discharge of pus was a prominent feature. I hope to draw from a consideration of these cases, which occurred in my own practice, certain conclusions of practical value.

I have excluded those cases in which there was reason to believe that the pus was the product of inflammation of the soft tissues alone. Cases of peri-articular inflammation may perhaps properly enough be called instances of hip disease. They sometimes present serious and alarming symptoms, but the comparative brevity of the affection and the subsequent integrity of the functions of the joint are sufficient evidence that the disease is not that insidious and destructive hip disease which begins in the bony tissue and pursues a slow and baleful course through the structures of the joint until the usefulness of the part and the symmetry of the body are compromised. The cases which have been reviewed in the preparation of this paper belong to the latter class.

\* Read before the New York Orthopædic Society, January 29, 1885.

These cases stand over against a class of cases of osteitis of the hip in which abscesses did not occur, or, if they occurred, took the form of fluctuating tumors, which were absorbed. From the nature of the case, it is not possible to demonstrate that the occurrence of abscesses in this disease can be prevented by treatment, as it may be said of a given patient who escaped abscesses, that he may have been the subject of a dry inflammation, and would have escaped them in the absence of treatment. It has been observed that this complication happens in some cases early and in others late in the course of the disease. This fact suggests the thought that the character of the inflammation, whether dry or purulent, depends on the diathesis or the general condition (liable to change) of the patient rather than on any change that may be effected in the tissues of the diseased hip.

If it is possible for abscesses to be prevented by treatment, it would seem that the measures adopted in the cases under consideration might reasonably be expected to prevent suppuration in those cases in which it had not already set in. The treatment pursued has been based on pathological conceptions which may be expressed as follows: A center of inflammation appears within the bone and slowly spreads, accompanied by hyperæmia and softening, until the shell of compact bone is perforated, and all the tissues of the joint are involved in the inflammatory softening and disintegrating process. We will leave out of account the questions of the strumous element and the pernicious effects of reflex muscular action. That the pressure from reflex muscular action is not an important element, I have tried to show in former papers.\* However these questions

\* "St. Louis Courier of Medicine," May, 1881, pp. 367-372; "New York Medical Journal," July, 1882, pp. 1-17; "Medical Record," May 12, 1883, pp. 509-512, July 7, 1883, pp. 1-4.

may be viewed ultimately, there is no question that the disease, in a great majority of instances, comes to a natural, not fatal termination, as is evidenced by the common expressions, "Nature's cure" and "the natural cure" of hip disease.

Given these pathological elements, treatment presents itself as a matter of course as follows: 1. The increased vascularity attending inflammation in the tissues of the joint requires arrest of motion in the joint, or fixation. 2. The softening of the bony tissue and its increased fragility require that the joint be relieved from the weight of the body in standing, and the direct concussion transmitted up the long bones of the limb from the heel in walking and running. 3. As the cure is to come by natural processes, it is important that the general condition be kept at the highest possible point of excellence. The patient should, therefore, be active out of doors, and enabled to follow the ordinary pursuits of his time of life.

These difficult requirements are so well met by the use of the hip-splint, properly constructed, rightly adjusted, and worn day and night, that the pain attending the disease is mitigated, the duration of the affection is shortened, and the extent of its ravages limited, and it is surmised, with a fair degree of probability, that, in certain cases, abscesses have been prevented. It should not be lost sight of, in passing, that deformity, so liable to follow this disease, is largely prevented by the persistent use of the hip-splint, which also secures whatever mobility may have been left in the joint after the storm of inflammation has swept through it.

At the first glance it would seem that the prevention of abscesses in this disease is extremely desirable. In practice, however, it has been found that a comparison between those cases of osteitis of the hip which are free from purulent dis-

charges and those in which such discharges occur brings to light several circumstances which take away the dread of abscesses, and make their occurrence, if not a desirable event, at least an evil attended with compensating advantages. Their occurrence appears to shorten the duration of the affection. The degree of deformity following treatment depends in no way on the presence or absence of purulent discharges, and the clear picture of pathological anatomy which may be inferred from the presence of sinuses discharging pus, and leading to diseased bone, is not only interesting, but of practical value, as it leads to a cheerful endurance of prolonged mechanical treatment (always more irksome, by the way, to the friends of the patient than to the patient himself), and enables the physician to say with confidence, when the sinuses are permanently closed, that the bone is also firmly and permanently cicatrized.

It follows, then, that the abscesses of hip disease are not to be considered dreadful precursors of a fatal result. In patients treated in accordance with the principles suggested above, a purulent discharge is more or less an inconvenience, but its occurrence, whether from one aperture or many, is not a cause of anxiety. It is exceptionally attended with hectic or emaciation. When these appear, they indicate a condition of the patient serious indeed, but by no means necessarily a result of the abscess. There is no evidence that the discharge, as such, exhausts the strength of the patient. This tradition, like many another, is disproved by experience. The general condition of the patient remains good, and not infrequently it is robust. He continues active in locomotion without the assistance of crutches, excepting the ischiatic crutch of the hip-splint, and follows with success the ordinary pursuits of life. The diseased tissues are defended from motion, and the violence inseparable from standing and walking in the usual way. The

morbid process is replaced in time by the reparative process, and cicatrization is established and perfected in bone, connective tissue, and integument. The amount of ultimate deformity does not seem to be influenced by the presence or absence of sinuses, and the cases, few in number, which terminate fatally, give no convincing evidence that the presence of a purulent discharge increases the liability to death.

It may be recalled, at this point, that attempts have been made to establish early communication with the seat of the initial lesion in hip disease by operative interference, thus anticipating the formation of an abscess and its resulting sinus. Such an attempt was made in 1867 by Mr. Kirkpatrick, of Dublin,\* who tunneled the great trochanter with caustic and the knife in a case of incipient hip disease; and more recently Mr. Macnamara states that he is in the habit of boring through the trochanter into the head and neck of the bone. In this manner he thinks that we may excite in the part a different action, and often a more healthy one, than that which exists.† If the views which I have expressed above are correct, to the effect that repair depends on some favorable change that takes place in the general condition of the patient rather than on any change which may be brought about in the tissues of the diseased joint, it is difficult to see how the procedure of Mr. Macnamara can hasten, any more than aspiration or an incision, the initiation of the process of repair. It is to be hoped, however, that in a future publication he will give us a report of the result in the cases thus treated.

I am unable to throw light on the interesting but obscure question of the starting-point of the abscesses of hip disease. In very advanced cases the sac of the abscess com-

\* "British Medical Journal," August 31, 1867, pp. 177-179.

† "Diseases of Bones and Joints," C. Macnamara, London, 1881, pp. 441, 442.

municates with the cavity of the joint, and it is surmised that, in cases not so far advanced, the abscess is but a depot for the pus which occupies the cavity of the joint, where it exists as a product of secondary inflammation in the lining of the joint, or as the result of the breaking into the joint cavity of a caseous focus in the bone. But there are reasons for believing that many of the abscesses of hip disease are not connected with the cavity of the joint at all,\* being the result, perhaps, of the perforation of the compact shell of the bone below the line of attachment of the capsular ligament, or the result of other less understood processes, as suggested by the fact that fluctuating tumors occurring in the progress of hip disease have been observed to give exit, by aspiration or incision, to fluids at first clear and later purulent.

Although the starting-point of the abscess is uncertain, the location of the discharging aperture is, of course, easily recognized. A classification of the cases under review shows that about 30 per cent. of the sinuses appear on the anterior surface of the thigh, 27 per cent. on the outer surface, including the region of the great trochanter, 20 per cent. on the posterior surface of the thigh, including the gluteal region, and 13 per cent. on the inner side of the thigh. Of the remaining 10 per cent., half appear in the groin and the other half over the pelvic bones posteriorly. I have observed that the sinuses which are found in the last-named regions are preceded by sinuses opening in the thigh. It may be inferred from this that collections of matter in and around the joint seek by gravitation an outlet at a lower level than that of the joint, and that sinuses appearing at a higher level indicate that the pelvic bones are invaded by the disease, an inference which

\* See some interesting observations on this point published in the "Transactions of the American Medical Association," 1863, pp. 159, 160.



is supported by the fact that a large proportion of the sinuses found at the higher level leave scars which are directly attached to the subjacent bone. I have found but little evidence that the pus in hip disease follows the lead of muscular sheaths. It appears rather to take the shortest course toward the surface, influenced to a certain degree by gravitation. Scars resulting from sinuses have been observed directly attached to the femoral shaft, the great trochanter, the horizontal ramus of the pubes, the crest or the spines of the ilium, and the posterior surface of the sacrum. Scars thus attached to underlying bone impart a curiously dimpled appearance to the part of the body in which they are found, especially in subjects inclined to be fat. Whenever they appear, the sinuses do not interfere with the proper application and comfortable wearing of the hip-splint, which makes pressure only where the perineal straps support the ischiatic and pubic bones. The pressure made by the straps forbids an eruption at these points. I have seen no case in which the pus has found an exit by the vagina or rectum. Dr. Gibney has reported an interesting case of the former kind,\* and Dr. J. Randolph † and Dr. Edmund Andrews cases of the latter. Dr. Andrews remarks in regard to his patient (whose hip joint he had excised): "This is the only instance which I ever heard of where a fistula in ano opened on the outer side of the thigh." ‡

In regard to the treatment of the abscesses of hip disease, the histories of the cases under review indicate that the precept that pus should be released by an early and free incision is a rule which is not to be always followed in the management of the abscesses of hip disease. This opinion was ably maintained by Dr. John F. Ridlon in a discussion

\* "The Hip and its Diseases," V. P. Gibney, New York, 1884, p. 181.

† "American Jour. of the Med. Sciences," February, 1831, p. 301.

\* "Chicago Med. Examiner," June, 1861, p. 293.

which took place in the New York Pathological Society in April, 1883.\*

It can hardly with reason be supposed that the processes, either destructive or reparative, which take place in the bone in the progress of this disease, can be affected by incisions, local medications, dressings, the introduction of drainage-tubes, the injection of antiseptic fluids, the distension of the sac of the abscess, or the use of the faradic current † as a means of hastening suppuration, when we consider that purulent collections, sinuses, and discharging fluids are but phenomena of the soft parts, secondary in every sense to the changes taking place in the bony tissue. If the collection of pus were the starting-point or the main feature of the disease, an early and free incision, as for a furuncle, would be admissible. But in hip disease the trouble is primarily and chiefly a disease of the bony tissue composing a joint, which is best treated generally by the administration of tonics and the regulation of the hygiene, and locally by fixation and protection from violence. If abscesses occur, it is shown by experience that the retention of pus, even in large quantities, or the presence of a purulent discharge, does not prevent the process of repair.

In the cases under review, 30 per cent. of the sinuses

\* "Med. Record," May 25, 1883, p. 584. On this point Mr. Ford wrote as follows: "There is no rational system known which can point out the advantage to be derived from an artificial opening, made in any way whatsoever, during this stage of the disease; neither is there one case on record where an active employment of the art of operative surgery has been found materially useful in this period of the complaint." "Disease of the Hip Joint," by Edward Ford, second edition, London, 1810, p. 117.

† Dr. A. D. Rockwell has reported cases of phlegmonous and cold abscesses in which good results were obtained by this agent. "Medical Record," September 21, 1878, pp. 226, 227.

followed incisions, while the remainder were the results of spontaneous openings. The proportion of the latter would have been still larger if I had not in the earlier cases implicitly followed the old rule.

In some cases the sac of the abscess attains a great size, inviting reduction by the aspirator or bistoury. The appearance is that of a fluctuating tumor of enormous proportions, attended with scarcely any œdema, no pain, and no effect on the general health, and interfering but little, if at all, with locomotion on the hip-splint. After this condition has persisted for many weeks or months, a small area is found in which the integument, reduced to the thinness of paper, is the only barrier to the escape of the fluid. This insensible membrane is at length perforated; there is a torrent of thin purulent fluid containing caseous flakes or masses; the tumor collapses; there is no general disturbance, and cicatrization follows in a few weeks; and it is found that the diseased bone has undergone a reparative process, and the patient is cured, with more or less of the asymmetry and functional impairment which, as a rule, attend recovery from this disease. An unimportant scar, attached to the deeper tissues of the limb, is the only remaining trace of the abscess. Such a case follows the type of the cold abscess of caries, seen more often in cases of Pott's disease of the spine.

The abscess of hip disease does not by any means always present this character. Not infrequently the approach of matter toward the surface is attended by pain, heat, and redness, in addition to the swelling. There may also be present the transient general reaction commonly associated with a phlegmon.\* When an abscess presents these characteristics, it is not uncommonly the first of a series, the individual members of which appear at varying intervals, and not in-

\* See Ford, *op. cit.*, pp. 116, 117.

frequently at points remote from the seat of the initial eruption. When a case presents these features, it is likely to be long in duration, occupying many weary months before the bone is healed and the sinuses are closed. Each new eruption may or may not be preceded by pain and general disturbance.

It is in these cases that the hip-splint is especially useful. Sometimes the extreme sensitiveness of the joint, which resents the slightest jar or disturbance, is added to the pain caused by the abscess. In such a case the patient insists that the splint be tightly keyed, knowing by experience that on this depends fixation of the exquisitely tender joint. He also demands that the splint be so adjusted that his heel shall be held from touching the foot-piece of the splint, knowing that on this depends the protection of the joint from violence in standing and walking. In the treatment of the cases under review, considerations of an æsthetic nature have not prevented the use of a splint strong enough to render these important services. Many patients have been tantalized by the application of apparatus too weak to be effective.

It sometimes happens that a tumor points, and is apparently about to open spontaneously, when a sudden copious discharge sets in from a sinus already established, on another side of the limb, perhaps, and the tumor collapses, leaving, when recovery takes place, a permanent depression, or dimple, where the pointing had been. The intercurrent of any of the exanthemata is marked by great local activity, the sinuses becoming cavernous, the discharge of thick pus being very profuse, and the integument distended and red. A sinus sometimes discharges freely, and at other times scantily, and for weeks together it may be closed to open again. In some cases the patient suffers malaise and headache while the discharge is scanty or suppressed, which

disappear when the flow resumes activity. When at length recovery is approaching, the sinus slowly contracts, and the surrounding tissues form a depression. The matured cicatrix occupies the bottom of the depression, and is perhaps attached to the underlying bone. When there are many sinuses, the order in which they close is not necessarily that in which they made their appearance. It is reasonable to surmise that the last to close is that one which is most directly connected with that surface or point of bone which is the last to cicatrize.

In the progress of one of these cases of prolonged supuration the question of an incision for the release of pus will often arise. While I have seen no case in which such an incision has done harm, I have also seen no case in which it had a positive controlling influence for good generally or locally. If the physician has the opportunity, he may relieve tension and allay pain by an incision. But, as the cases under consideration have invariably been in "office" or "dispensary" patients, freed by the hip-splint from the sick-room and hospital ward, it has often happened that the patient, through dread of the knife, has remained away, the abscess pursuing its painful course until a spontaneous opening has occurred. I have seen, however, no case in which the welfare of the patient was seriously compromised by the expectant treatment thus forced on the physician. It may almost be said that in practice it is well to make light of this feature of a case of hip disease, especially as undue attention is almost certain to be accorded to it in the domestic circle. The borders of the aperture of a purulent sinus are not particularly sensitive to external impressions; but the friends of the little patient will concentrate their attention on this feature, as entailing unusual distress and danger. Unless the stream is too copious, it is best to leave the opening uncovered, relying entirely on evaporation and

frequent change of under-clothing, which is to be boiled the instant of removal. Sometimes a deodorizing application is desirable. In any event, poultices and kindred applications are to be avoided after the discharge has begun.

If the physician chooses to regard himself as a military commander, intent on subduing the enemy entrenched in the bony tissue, let him beware of having his attention distracted by sorties in the soft parts. Let him control the bone disease by fixation, protection, and hygiene, and the abscesses and sinuses will not require the bistoury and drainage-tube.

The following are illustrative cases :

CASE I.—A girl, aged seven. Right hip. Duration of disease one year. Nine months after treatment was begun a fluctuating tumor appeared on the anterior surface of the upper part of the thigh. Two months later the abscess, having reached a great size, opened without pain when the child was sweeping the sidewalk with a toy broom. There was a torrent of fluid. Collapse of the tumor was followed by a purulent discharge, containing caseous flakes and masses, which continued for seven months, when it ceased and left a firm cicatrix. The sinus remained closed for seven months. At the end of that time moisture was found in place of a dry scar, and for the past year the place of the sinus has been moist and frequently covered by a small scab. The child is an active and healthy school-girl, still wearing the hip-splint on account of the delay of permanent cicatrization, and to make sure of recovery with the present good position of the limb. There is ankylosis.

CASE II.—A boy, aged five. Right hip. Duration of disease three years. A fluctuating tumor occupied the anterior surface of the thigh, extending from the level of the great trochanter to one inch above the patella. Four weeks after treatment was begun the abscess opened when the patient was asleep. On awaking in the morning, he thought he had wet the bed. There was speedy collapse of the tumor. The boy's general condition has remained good, excepting on two occasions, when

there was an arrest of the discharge, with accumulation of pus, and some general reaction. A profuse discharge, which occurred spontaneously by the original sinus, promptly relieved the local and general symptoms. All of the usual symptoms and signs of osteitis of the hip joint have been observed in this case. Fifteen months after the abscess broke the sinus was firmly cicatrized. At the present time, three months later, the patient is an active and robust school-boy, with good prospect of making an excellent recovery with useful motion in the joint.

CASE III.—A girl, aged seven. Left hip. Duration of disease two months. A fluctuating tumor was detected six months after treatment was begun. Ten months later the tumor had reached an enormous size, and pointed on the inner side of the thigh, presenting a small area of insensible integument, apparently the only barrier to the escape of the fluid. I am informed that the child opened the abscess while at play, using a pin for the purpose. There was a copious flood and a speedy collapse of the tumor, followed by a purulent discharge for five months. There were no symptoms attributable to the abscess before or after its opening. Throughout the treatment the patient wore the hip-splint day and night, as did all the patients whose cases are here reported. The child made a good recovery, with ankylosis. It is now three years and three months since the sinus closed, and two years and nine months since treatment was suspended. The scar is small, deeply depressed, and attached to the bone, and the girl is in perfect health.

CASE IV.—A boy, aged four and a half. Right hip. Duration of the disease one year. Fifteen months after treatment was begun a fluctuating tumor was found over the great trochanter. It slowly increased until it extended on the outer and posterior surface from above the trochanter to the junction of the middle and lower thirds of the thigh. It then slowly decreased, and twenty-one months after it was first noticed it had disappeared. The tissues on the posterior surface of the thigh, however, remained condensed, and, three months after the disappearance of the tumor was recorded, two sinuses appeared on the outer and posterior surface of the thigh, and two months later a third appeared on the outer surface. They discharged freely, and,

six months after the first appeared, they had permanently closed. In this case the repair of the diseased bone was in progress while the fluid collection attained a large size and disappeared, and while a subsequent copious purulent discharge was taking place. At the present time, sixteen months after the closing of the sinuses, and three months after treatment was suspended, the boy is free from symptoms, and the scars are depressed and attached to the deep fascia. There is free motion through  $45^{\circ}$  of flexion and  $20^{\circ}$  of abduction, with considerable motion in adduction. That the case was one of osteitis of the hip joint, however, is evident from the duration of the affection and the following well-marked features: recurring pain in the knee for a year, nocturnal crying, marked deformity and reflex arrest of motion when first examined, the thigh being flexed  $67^{\circ}$  and abducted  $40^{\circ}$ , muscular atrophy, real shortening of one inch, and pain on the slightest disturbance of the joint, relieved by the application of traction or fixation.

CASE V.—A boy, aged nine. Left hip. Duration of the disease sixteen months. Two sinuses—one the result of an incision and the other a spontaneous opening—had been discharging copiously in the region of the great trochanter. Three months after treatment was begun a third appeared in the upper part of the inner surface of the thigh, and in the following sixteen months six others appeared on the anterior and posterior surfaces of the thigh, in the groin, and over the sacrum. The discharge was for a number of months very copious, but it slowly diminished, and four years and five months after the last sinus appeared they had all permanently closed. While this prolonged discharge was taking place, the boy suffered, but without contracting permanent damage, from measles, scarlet fever, and mumps. At the present time, five months after the permanent closure of the sinuses, the lad is in perfect general health, and about to make a good recovery, with ankylosis. He is very active, still wearing the hip-splint in order to retain the present good position of the limb.

CASE VI.—A girl, aged seven. Left hip. Duration of disease nearly three years. An abscess had opened spontaneously on the anterior surface of the upper part of the thigh, and had



been discharging for five months. Six months after treatment was begun the sinus permanently closed. At the present time, sixteen months after the sinus closed, the child is in perfect health. The scar is deeply depressed, and attached to tissues near the femoral shaft. There is wide motion,  $40^{\circ}$  antero-posteriorly and  $35^{\circ}$  laterally, measured with the assistance of a goniometer devised by Dr. Gibney. That the case was one of hip disease, however, is evident from the following features, which were well marked: muscular atrophy, real shortening, frequently recurring pain in the knee for two years, contraction of the adductors, which was observed for two years, and for which section of the muscles was repeatedly advised,\* deformity—the thigh being flexed  $90^{\circ}$  and adducted  $35^{\circ}$ —and pain on the slightest disturbance of the joint relieved by traction or fixation.

CASE VII.—A boy, aged five. Left hip. Duration of disease two years. A sinus following an incision in the outer surface of the upper part of the thigh had been discharging for seven months. Six months after treatment was begun the sinus permanently closed, and the boy made a good recovery, with ankylosis. One year after treatment was suspended the child was in excellent health, and the scar was deeply depressed and attached to the bone.

CASE VIII.—A boy, aged four. Left hip. Duration of disease one year and six months. Four months after treatment was begun, pus was released by an incision in front of the great trochanter, and five months later another incision was made in the same region. Pus was discharged in varying quantities for six months, when the sinuses permanently closed. The patient remained under observation for twenty-two months longer, and, when last seen, was in good general condition, and in a fair way to make a good recovery, with ankylosis.

CASE IX.—A girl, aged nine. Right hip. Duration of disease one year. Nine months after treatment was begun pus was released by an incision behind the great trochanter. A purulent discharge continued for two years and nine months,

\* Quando tandem chirurgi nostri praeclari discent contractionem reflexam musculorum esse unam ex indicationibus coxalgiae?

with brief intermissions, during which the patient suffered from lassitude and headache. One month after the sinus permanently closed, treatment was discontinued against advice. Three years and eight months later the child was found in perfect health. She had recovered, with ankylosis, and a strong and fairly useful limb.

CASE X.—A boy, aged six. Right hip. Duration of the disease two years. One year and three months after treatment was begun a tumor appeared on the outer side of the thigh. An incision made six months later led to a very copious discharge for three months, followed by a scanty discharge for seven months, when the sinus closed. The boy ultimately made a fair recovery, with ankylosis. I am informed that two years and six months after the sinus closed it reopened spontaneously, and discharged for about six months. At the present time, four years and nine months after the second closing of the sinus, the cicatrix is evidently final, and the lad is in excellent health.

CASE XI.—A girl, aged three. Right hip. Duration of disease one year. Five months after treatment was begun fluctuation was detected, and an incision made on the outer surface of the upper part of the thigh. The sinus thus established was followed by five others, which appeared without incision on the posterior and inner surfaces of the thigh and in the groin. There was a constant discharge for eighteen months, when the sinuses permanently cicatrized, and the child made an excellent recovery, with ankylosis. It is six years and two months since the sinuses permanently closed, and five years and six months since treatment was suspended. The scars are deeply depressed, some of them are attached to the underlying bone, and the girl is in robust health.

CASE XII.—A boy, aged seven. Right hip. Duration of the disease four years. Four months after treatment was begun fluctuation was detected, and an incision was made on the inner side of the thigh. A copious purulent discharge continued for two years from this and three other sinuses on the outer surface of the thigh and in the groin. During this time the patient wore the hip-splint constantly, and was almost daily out of doors. This statement is true as applied to all the cases here

reported. The sinuses finally closed, and an excellent recovery followed, with ankylosis. At the present time, eight years after the sinuses permanently closed, and six years and two months after treatment was suspended, the boy is in robust health. The scars are deeply depressed, and some of them are attached to the underlying bone.

In these histories regard has been had only to the deportment of the abscesses. Other clinical features of interest have been omitted, excepting that in each instance enough of the history has been given to establish that the case was one of chronic osteitis of the joint. It is well to state, however, that the results and prospects as regards symmetry and mobility in the cases reported, as well as in the whole number under consideration, are such as to commend the treatment pursued.

The cases above reported are cited as corroborating the views set forth in the preceding pages. They do not by any means include those of all the patients whose histories have been reviewed in the preparation of this paper. A number are still under treatment, a few have died from causes more or less directly connected with the joint disease (consumption, visceral degeneration, and tubercular meningitis), and a number, as happens in all affections of a chronic character in which perfect restoration can not be promised, have strayed away and are lost to observation. In the whole number, however, no case has shown clinical features at variance with the views which have been presented above, to the effect that abscesses are phenomena of secondary import in the progress and management of a case of hip disease, and that their treatment may in many cases be purely, or almost purely, expectant. This precept, however, is to be construed with a keen appreciation of the necessity of thoroughly treating, in accordance with the principles suggested above, the disease of which they are an incident.

[Reprinted from "The New York Medical Journal for January 24," 1885.]

I have devised the following improvements in the construction of the hip splint for the purpose of diminishing

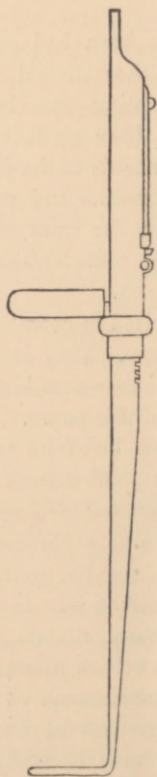


FIG. 1.—Front view.



FIG. 2.—Side view.

the weight of the splint, while retaining its strength and inflexibility by disposing the metal so that it shall resist to

the best advantage the strain to which it is subjected. When a hip splint is made strong enough in the pelvic band and upright to perform the function of an efficient ischiatic crutch, preventing the patient's heel from reaching the foot-piece of the splint in walking or running, it is found necessary to give considerable weight to the apparatus when constructed, as it often is, with a round upright, or with the flat side of the upright toward the patient's limb. If the upright is made flat and attached to the pelvic band in such a way that its edge is toward the patient, it is practically inflexible, and the amount of steel used in its construction may be greatly reduced. The metal may be thinner even than is shown in Fig. 2.

Having the rack at the upper part of the splint, as shown in the cuts, further reduces the weight of the apparatus by allowing the upright to taper rapidly toward its lower end, and also puts the heavier portion of the upright near the center of gravity of the body, where it is carried more easily than when massed near the patient's foot.

I have applied fifteen splints constructed on this plan. Some of them have been in use more than a year and a half, and have demonstrated that the changes indicated above are improvements.

The cuts also show a U-shaped attachment, previously described, for more completely arresting motion in the joint. It has been in use nearly five years, and has proved its value. It is adjustable vertically on the barrel of the upright, and takes the place of the flexible device known as the knee-cap.





# The New York Medical Journal,

A WEEKLY REVIEW OF MEDICINE.

PUBLISHED BY  
D. Appleton & Co.



EDITED BY  
Frank P. Foster,  
M. D.

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