THE DIAGNOSIS OF CHRONIC JOINT DISEASE.

BY

W. R. TOWNSEND, A. M., M. D.

REPRINTED FROM THE

New York Medical Journal

for May 25, 1895.

Reprinted from the New York Medical Journal for May 25, 1895.

THE DIAGNOSIS OF CHRONIC JOINT DISEASE.*

By W. R. TOWNSEND, A.M., M.D.

In the subdivision of medicine into specialties, chronic joint diseases are usually referred to the orthopædic surgeon for treatment, but the early diagnosis of these affections has to be made by the general practitioner. He first sees the patient, and either correctly interprets the symptoms of beginning trouble, or, after a more or less careful examination, decides that the condition is due to a sprain or to rheumatism, or perhaps detects nothing abnormal, only to learn later, in many cases, that he has made a serious error.

Many a practitioner, when called to such a case, will admit his lack of knowledge and at once call in a consultant, who can correctly interpret the signs present. This, while preferable to committing serious errors, should rarely be necessary, for all practitioners should be able to make the diagnosis, at least in the simpler cases. Obscure and difficult types will require much thought and large experience to correctly interpret, but they are not often seen.

* Read before the Society of Alumni of Bellevue Hospital, April 3, 1895.

Errors are usually due not so much to ignorance as to a failure to thoroughly examine the patient. Many, however, lack the necessary knowledge of how to examine and bring out the symptoms, and the object of this paper is to refer to the principal symptoms of chronic joint disease and to show how the examination should be made to detect their presence or absence.

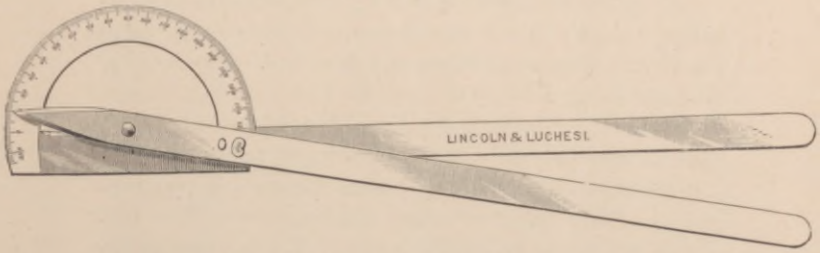
In speaking of chronic joint disease I refer to those cases of arthritis or osteitis, chronic in nature, due to tuberculosis or traumatism, beginning either in the joint structures or in the bone, which are mostly seen in the first two decades of life. In examining a patient with suspected joint trouble our first step is to obtain a careful and accurate history. This is not always an easy matter, and too much reliance must not be placed on statements made until a very close cross-examination proves that the parent or patient is an accurate observer; for chronic joint disease comes on, as a rule, insidiously, and the first symptoms are apt to be overlooked, and a serious exacerbation due to a traumatism will be assigned as the cause and beginning of the disease when it is not. But histories have their value, and should be weighed with the symptoms in making a diagnosis.

The most constant and characteristic symptoms of chronic joint disease are reflex muscular spasm, limitation of joint motion, deformity, atrophy, and pain. The presence of these symptoms, with the history, will enable us to make the diagnosis.

The instruments used to aid us in the examinations are few and very simple. An ordinary tape measure is necessary to determine any alteration in the length or in the circumference of a limb, and also either an increase or decrease in the size of an articulation. The steel tape, while it may be more accurate, is not as convenient as the ordi-

nary tape; it is too stiff and unyielding, and our preference is for the cheaper and simpler one.

The only other instrument needed is a goniometer. This is used to measure the amount of motion of the joint. It consists of a half circle, with the degrees marked upon it from zero to one hundred and eighty. There are two arms to it, one fixed, the other movable. The fixed arm has attached to it the graduated arc. The movable arm has its centre of motion opposite the ninety-degree point, and when placed at zero and one hundred and eighty degrees is exactly parallel with the fixed arm.



To measure the amount of motion of any joint, we place the instrument opposite it, the joint centre of motion being opposite the centre of motion of the movable arm, and by having the two arms correspond with the long axis of the bones entering into the articulation any movement of the joint will show us in degrees the amount. This gives an accurate measurement, and may enable us to detect slight limitations which might otherwise be overlooked.

The most important symptom in chronic joint disease, as was first prominently pointed out by Shaffer, is reflex muscular spasm. It is among the earliest to appear, and the one upon which we rely the most to make a diagnosis. It is an involuntary muscular protection of the articulation; it precedes the limp, and may really be said to cause it,

for, disease being present, reflex spasm causes a limitation of motion in one or more directions, and this causes a disturbance in the rhythm of the gait, and a limp follows necessarily. This muscular spasm may be very slight and only noticeable at the extremes of motion, and there may be no deformity as a result; or it may be so great as to lock the joint, and this usually occasions deformity of a marked degree. Spasm is present by day and by night, does not yield to sleep, but completely disappears under anæsthesia, hence the uselessness of giving an anæsthetic to determine whether or not there is beginning joint disease.

To this condition of spasm we may in some cases attribute the pain in the articulation, as it tends to bring in contact the diseased surfaces, and this may be the cause of the night cries.

These night cries are quite characteristic of chronic joint disease, and while their absence is not proof positive that disease does not exist, yet their presence is very suggestive of it. They are more frequently found in disease of the larger articulations than when the smaller are affected. The night cry of spinal disease is more apt to be dull in character, rather a moan than a sharp cry, which latter prevails in hip and knee disease. The position taken by Valette, "that there can be no hip disease if the motions of the joint are perfect," is also true of other joints. The reflex muscular spasm, when once present, remains until a cure is effected, and this is important. The limp may apparently disappear, yet, if true joint disease exists, examination will show a limitation of the normal movements, although it may be very slight, or may only be clearly brought out when the child is fatigued. Of course, it also follows from this that we may make the diagnosis before lameness occurs. Careful and constant examination of normal and diseased joints will enable any practitioner to ac-

quire the *tactus eruditus*, and to distinguish reflex muscular spasm when present.

As a result of the joints and the muscles about them being supplied by the same nerves, atrophy is another early symptom of value. Brown Séquard years ago showed that nerve irritation alone was capable of determining rapid and early atrophy of the muscles with a decrease or disappearance of the faradaic contractility. This atrophy is not necessarily due to a neuritis, but rather to trophic changes, and comes before disuse of the limb could cause it, although the latter is a potent factor later on in the disease.

This atrophy usually affects muscles on both sides of a joint, but principally those whose nerve supply is the same as the joint. The atrophy also causes changes in the contour of the parts, and in many cases an apparent increase in size of an articulation is simply due to atrophy of the parts near by. Pain may or may not be a symptom of chronic joint disease; it is very unreliable, and may not be felt at all in the diseased articulation, but at the terminations of some of the nerves sending filaments to the joints, as the pain of Pott's disease often felt in or about the stomach, and the pain of hip disease felt at the knee. Some patients have joint disease with abscesses and serious complications and yet never have pain, while in others it is a most prominent symptom. Joint tenderness or pain on pressure also varies greatly. The absence of pain is not of great value, but its presence with other symptoms is. The deformity in joint disease is due usually to the muscular spasm in early stages, later to joint changes; and with this brief description of the principal symptoms I will refer the reader to the various text-books on surgery for description of the particular symptoms in each joint, and now give a short account of the normal movements of the different joints, and how to examine them to determine the presence

or absence of reflex muscular spasm and limitation of motion, of atrophy, and pain.

In the first place, it is absolutely necessary in the examination of any joint that the clothing be removed to a sufficient amount to permit of free inspection of the joint, and of the corresponding one of the opposite side. In the case of young children no difficulty is experienced, and there will be none in those of more mature years if the necessity for the procedure is explained to the patient.

Disease of the Spine.—To determine the presence or absence of reflex muscular spasm in spinal disease it is necessary to have the patient stand before us so that the entire back can be clearly seen. If the disease affects the cervical region, the muscles in and about the neck, both posteriorly and laterally, will be tense in a state of spasm and prevent free motion of the head. The head may be inclined backward, forward, or to one side, and so held.

Systematic and methodical examination should be made here as also in all other joints, for only by such methods shall we be sure to overlook nothing of importance. The patient standing erect, note should be made of the contour of the spine, whether the normal curves are present, and whether there are any lateral, posterior, or anterior deviations. The movements of the head should then be tested, whether the patient complains of symptoms especially referable to that region or not. First, cause the head to be lowered so that the chin may approximate the sternum, then cause it to be raised and bent backward so that the occipital portion approximates the spine. Then ascertain the amount of lateral motion by causing it to be rotated so that the chin first approaches one shoulder, then the other. The patient having done these motions alone, grasp the head in your hand firmly but gently, and passive motion will give you the limits, if any, and enable you to detect

the presence or absence of muscular spasm. The back itself should then be tested by causing the patient to bend forward, backward, and to either side, and comparing the amount of motion with the motions of the normal spine. The movements of the lumbar and lumbo-sacral spines can not be well tested with the patient standing, so we examine for the presence or absence of spasm in these parts by causing the individual to lie on the face on a hard couch or table, and by raising the lower extremities with the hands we can detect any limitation of motion.

As we have no other joint in the same individual to compare these movements with, careful examination should be made of normal spines in patients of different ages to acquaint ourselves with the normal limits. Of course these vary greatly; the stout and the aged are far less supple than the thin and the young, and acrobats and gymnasts can bend far beyond the normal average; but a little practice will tell whether the inability to bend the spine is due to reflex muscular spasm or not. In some instances the spinal muscles will stand out prominently, being firmly contracted; but this is not always the case. When spasm exists in the cervical region alone, the lower dorsal and lumbar regions may be freely movable, and spasm of the lumbar region may not interfere with the motions of the head, but disease of the dorsal and lumbar regions is usually accompanied by a stiffness of the entire spine. It moves as one long bone, not as a number of small ones. In the normal spine the hips can be raised easily to form an angle with the vertebral column of thirty or forty degrees, and the motions laterally are very free, and any limitation, especially if accompanied by pain, should cause a careful examination to be made to see if any other symptoms of spinal disease are present.

No motions or tests should be made, except with the

greatest possible care, to elicit pain in the vertebræ; violent jarring of the head or severe bending of the spine may produce serious injury, and is never necessary to make the diagnosis.

Atrophy in spinal disease is difficult to measure, but may exist; it is of less importance in these cases than in disease of other joints.

The Shoulder.—In examining the shoulder and other joints besides the spine we have the benefit of another articulation of the opposite side for comparison, for there are practically no cases on record where similar joints of both sides of the body have been affected with chronic joint disease beginning simultaneously, although disease in one articulation may very rapidly follow disease in another.

The motions of the shoulder joint are flexion, extension, abduction, and adduction; and the combination of these in quick succession produces circumduction. In addition to these we have rotation, which is the movement round a vertical axis through the extremities of the humerus from the point of the head to the inner condyle, and this may be forward or backward.

The movements of the shoulder are very free, and in chronic joint disease always more or less limited, usually abduction being most markedly so. Normally the arm can be abducted to ninety degrees by the deltoid, and then raised even more than ninety degrees further by the trapezius and others.

Each motion should be carefully gone over and tested with the similar motion of the other shoulder, and spasm and limitation of motion will easily be detected. The amount on each side should be measured for purposes of comparison. Here, as in other joints, it is best to examine the normal joint first, as it often enables us to acquire the confidence of the patient, especially in children. The cir-

cumferences of the parts in and about the shoulder should be measured to determine the presence or absence of atrophy, and no tests made to elicit pain.

The Elbow.—The elbow being a hinge joint, flexion and extension are the only movements which can take place. These movements are oblique, the forearm being inclined inward in flexion and outward in extension. Flexion and extension are limited by contact of the coronoid and olecranon processes of the ulna with their corresponding fossa in the humerus. The limit of extension is reached when the ulna and humerus are nearly in a straight line or at about a hundred and seventy-five degrees; and flexion can be carried up to about thirty-five degrees, and is not limited by the coming in contact of the soft parts of the forearm and arm, but upon the proportion which the length of the olecranon and coronoid processes bear to the depth of the olecranon and coronoid fossæ. Any limitation in these motions accompanied by spasm, atrophy of parts below and above, and pain, together with the history, will enable us to make the diagnosis.

The Hip.—This is the joint we are most often called upon to examine; and to properly examine it, the patient should lie flat on the back on a hard couch or table, so that the spine can be made to touch the table and any tilting of the pelvis can be noted.

The normal motions are flexion, extension, abduction, adduction, rotation, and circumduction, but the latter may be left out in tests for limitation of motion. Extension beyond a hundred and eighty degrees is often spoken of as hyperextension, thus giving us seven motions.

The movements should be carefully examined and in regular order. The limb should be grasped firmly, and each motion carried to the full limit, or until spasm is elicited and the motion checked.

In well-marked cases of hip disease all movements are restricted, but in beginning disease only a few may show this restriction, and in such cases the greatest attention is to be paid to interference with abduction, superextension, and external rotation. Interference with extension alone is more apt to be due to spinal disease as a result of psoas and iliacus contraction than to hip disease.

The normal limits of the various movements at the hip vary considerably. Flexion is checked at about ninety degrees by the hamstring tendons if the knee is straight; but if the knee is bent it can be carried from forty to sixty degrees further, being then limited by the contact of the soft parts of the thigh against the anterior superior spine and abdomen. But the normal limits are greatly exceeded by many gymnasts and high kickers. The limitation from a straight knee should always be borne in mind, for the error is often committed that flexion of the thigh is limited when no such limitation really exists. Where knee disease is present, the thigh must be grasped above the knee and care taken not to make motion at the knee at the same time we make motions at the hip. Extension should be tested with the patient lying on the back, and such position is limited to a hundred and eighty degrees. To test for superextension, place the patient on the face, grasp the thigh, and note the distance the knee can be raised from the table. Usually the amount of superextension is about forty degrees. This motion is limited by the ilio-femoral ligament.

Abduction and outward rotation are possible in any position of the leg. Abduction may be carried to ninety degrees, but the average is about forty degrees; and when abducting the thigh it is well to steady the pelvis with the other hand so as to note the least spasm, which at once causes the pelvis to tilt.

Adduction and inward rotation should be tested for both with the thigh extended and flexed. When the thigh is extended the range of motion is much less than when flexed, because of contact with the opposite limb. It averages about thirty degrees. Rotation is best brought out by having the patient on the back and rolling the thigh under the hand.

Too much attention is usually paid to the division of hip disease into stages, with descriptions of the different deformities in each stage. Determine the presence or absence of reflex spasm, the presence or absence of atrophy of the thigh, the night cry, and the presence or absence of pain in the articulation, get the history, and the diagnosis can be made; and then the position of the limb should be noted, whether abducted or adducted, flexed, rotated in or out. That in the first stage abduction and apparent lengthening are the rule, in the next adduction and apparent shortening, in the later stages flexion, adduction, and real shortening, are facts which will necessarily follow when the disease is more closely studied. The position of the thigh and the presence or absence of atrophy will determine the shape of the nates, and the position of the fold of the buttock the gluteal crease.

In early examinations it is not advisable to use Thomas's test to determine the amount of flexion, as it may increase intra-articular pressure. This test is made by flexing the sound thigh on the abdomen and holding it there by the patient's hand placed in the popliteal space, then bending down the diseased limb as far as possible. In testing for pain, never use force; never jam the head of the femur against the acetabulum by knocking on the heel.

The Knee.—In the knee the motions are extension and flexion, and when the limb is flexed a slight amount of pro-

nation and supination. The movements, though, are much more complicated than at the elbow, as it is not a true hinge joint.

Remembering the fact that the points of contact of the articular surfaces shift, we see how the subluxation deformity so easily occurs when the hamstrings are firmly contracted by muscular spasm.

The limitations of normal motion are in extension when the tibia and femur are in a straight line. The patella is usually freely movable, and all the ligaments of the joint are on the stretch save the ligamentum patellæ and the front of the capsule. The motion is checked by the crucial and lateral ligaments.

Complete extension is always interfered with in chronic joint disease, and the inability to bring the knee perfectly straight is an important symptom. Flexion is limited by the contact of the soft parts of the calf and the posterior surface of the thigh. Starting with the leg fully extended at zero, it is permissible to the extent of a hundred and thirty to a hundred and sixty degrees, according to the fleshiness of the individual. Its limits can be easily determined in a diseased joint by comparing it with the sound joint.

Pronation and supination are limited even in the slightest cases. The amount of rotation in the normal joint when the knee is flexed forty degrees varies, but is about thirty degrees.

Atrophy is usually present both in the lower part of the thigh and in the calf.

Pain on pressure may be felt at this articulation, and is usually referred to the inner side of the joint, where the capsule is the thinnest and the bone nearest the surface.

The Wrist.—The normal movements of this joint are flexion, extension, abduction, and adduction, and the com-

bination of circumduction. Comparison of the two sides will show any differences, and spasm can be easily made out.

The Ankle.—This joint, being of the true hinge variety, permits only flexion and extension, but a very slight lateral movement is permitted when the foot is in extreme extension. Flexion may be carried to about forty degrees, and extension usually not over ten or fifteen degrees.

Movements of the smaller joints need not be discussed, but a careful test for reflex spasm and limitation of motion is the most important part of an examination to establish the presence or absence of chronic joint disease.

28 West Fifty-ninth Street.

The New York Medical Journal.

A WEEKLY REVIEW OF MEDICINE.

EDITED BY

FRANK P. FOSTER, M.D.

THE PHYSICIAN who would keep abreast with the advances in medical science must read a *live* weekly medical journal, in which scientific facts are presented in a clear manner; one for which the articles are written by men of learning, and by those who are good and accurate observers; a journal that is stripped of every feature irrelevant to medical science, and gives evidence of being carefully and conscientiously edited; one that bears upon every page the stamp of desire to elevate the standard of the profession of medicine. Such a journal fulfills its mission—that of educator—to the highest degree, for not only does it inform its readers of all that is new in theory and practice, but, by means of its correct editing, instructs them in the very important yet much-neglected art of expressing their thoughts and ideas in a clear and correct manner. Too much stress can not be laid upon this feature, so utterly ignored by the "average" medical periodical.

Without making invidious comparisons, it can be truthfully stated that no medical journal in this country occupies the place, in these particulars, that is held by THE NEW YORK MEDICAL JOURNAL. No other journal is edited with the care that is bestowed on this; none contains articles of such high scientific value, coming as they do from the pens of the brightest and most learned medical men of America. A glance at the list of contributors to any volume, or an examination of any issue of the JOURNAL, will attest the truth of these statements. It is a journal for the masses of the profession, for the country as well as for the city practitioner; it covers the entire range of medicine and surgery. A very important feature of the JOURNAL is the number and character of its illustrations, which are unequaled by those of any other journal in the world. They appear in frequent issues, whenever called for by the article which they accompany, and no expense is spared to make them of superior excellence.

Subscription price, $5.00 per annum. Volumes begin in January and July.

PUBLISHED BY

D. APPLETON & CO., 72 Fifth Avenue, New York.