

Original Articles.

THE DIFFERENTIAL DIAGNOSIS AND TREATMENT OF THE SO-CALLED RHEUMATOID DISEASES.*

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THE paper which I have to present to-night is a report of work which has been carried on during the past twelve years, chiefly at the Orthopedic Department of the Carney Hospital, with the sole purpose of increasing our knowledge of the many features presented by the so-called rheumatoid diseases. It is not the work of one man, but the work of a group of men who have been, or who are still, connected with that department.

The work was made necessary by the presentation of a large number of patients, at the very opening of that department, who were suffering with, or crippled from, diseases of the joints, commonly classed as rheumatoid or rheumatic, the intelligent treatment of which demanded more definite knowledge of the nature of the disease than then seemed to exist. The subject has been approached from the clinical, the pathological, the bacteriological and the chemical sides, and that more has not been accomplished in this time can only be explained by the chronic character of the diseases, and the need of waiting years, at times, in order for the different stages in any given case to develop.

It is possible in the time at our disposal this evening to give only a brief outline of the results of this work with the present conclusions, leaving the detailed report of the various phases of the work for other and special publication.

It was at once apparent, as soon as many patients were seen together, that there were several distinct types of disease included under this general head, which were quite constant in their clinical course and in the pathological findings, and while it is not possible to entirely disprove any connection between these types, the suggestion is certainly very strong that they represent different diseases. Usually but one type exists in the same individual, but at times more than one may be present. When this does occur the types can be recognized, and practically always they have developed at such different periods and are so unlike in their appearance that the patient even recognizes the difference. That more than one type is present in a given case is, of course, no more to be wondered at than that pneumonia and tuberculosis or any other combination of diseases should be present in the same individual.

From the large general class of rheumatoid disease five types have been separated, the essential characteristics of which are here presented.

The first: The *chronic, villous arthritis*, or "dry joint," is very common, and is not a general disease at all, but represents entirely a local process with no tendency to progression. In using the term, *chronic villous arthritis*, it should be

remembered that a villous change may take place in any inflammatory process in which a joint is involved, and that villi may develop in tuberculosis, in the atrophic form of arthritis, in the infectious arthritis, in the hypertrophic arthritis, and, in fact, in any condition in which there is inflammation or disease of the synovial membrane. In such conditions, the villi are simply a part of the general disease, and are present in connection with many other symptoms. In the simple chronic villous arthritis there are no general symptoms, and the local lack of tone with the folds of the relaxed membranes and the villi which form if the condition is of long duration are responsible for all of the symptoms. The terms most commonly used to describe this type of disease are the dry, the relaxed, or the hyperemic joint, and the chief characteristics are the crepitation, or creaking of the joint on motion, with varying degrees of pain and tenderness on use.

The condition is most commonly seen in the knee, and is very commonly associated with, and is undoubtedly in part due to, flat foot, the weakness there having resulted in strain and weakness at the knee. The muscular tone of the thigh and calf muscles is usually impaired, and the joint membranes, as a part of this lack of tone, become relaxed and passively congested. As a result of this the membranes are thrown into folds, and the crepitation is due to the rubbing of these folds or loose portions over each other. At times, under the continued irritation, the folds become more swollen, and fringes, or villi, result. When these are present they are found most commonly near the articular surfaces, and are undoubtedly due in large part to the membrane being drawn into the articulation during motion, this resulting in greater swelling, with consequently a greater liability of a repetition of the pinching of the fold or fringe in subsequent motion. It is in this way that symptoms of catching, and at times complete locking, in the joint are to be explained.

In such a condition the joint fluid is probably rarely, if ever, less than normal, so that the joints are not dry, and if the villi are numerous, so that on motion the irritation or catching is marked, the internal trauma which results may be followed by a marked increase of the fluid, the same as would result if the trauma were received from the outside. The cause for this excess of fluid, therefore, is purely mechanical, and is not due to a general disease or to any chemical or diathetic condition. It is absorbed under compression and quiet, and reappears again if the irritation is continued.

When such a condition has been present for any considerable length of time degenerative changes take place, and tissues of a higher type are replaced by tissues of a lower. The change most commonly seen is the fatty degeneration of the villi, so that the ends of the villi as they are frequently seen are made up of distinct lipomata. At other times a considerable fold of membrane may undergo the same change, or several villi

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may join, and the so-called "lipoma arborescens" result. Covering these there is usually a mere film of membrane as the remnant of the original synovial tissue. When these lipomata are present as large masses, they are most commonly seen just above and to the outside of the articular surface of the femur, and just below the patella in the fold of membrane under the patella tendon. As villi they may be found anywhere, but always most numerous about the articulation. At times a calcareous degeneration is seen, and in the folds of the membrane, entirely removed from the normal articular cartilage and bone, small cartilaginous or bony masses are found, and it is probably in this way that many of the so-called "joint mice" develop.

The treatment of such a condition naturally consists in improving the tone of all the joint structures concerned in the action of the joint. The muscles above and below the joint should be developed, and for this purpose massage in its various forms, with stimulating bathing, is of benefit, together with any form of muscular exercise in which the joint irritation is not increased. If flat foot is present, or if there is any other definite source of strain or weakness, this should, of course, be corrected. All forms of use, such as stair climbing and hill climbing, which tend to increase the irritation, should be avoided. For the joint itself, stimulating bathing, gentle massage, "sweating" with rubber dam, electricity, hot air, etc., are all of advantage in improving the nutrition and tone of the part. During exercise, flannel bandages, the adhesive plaster strapping, or some similar form of protection is of benefit, by controlling the extremes of motion and thereby lessening the irritation and danger of the membranes catching in the articulation. If the villi or the lipomatous change is marked so that either of these conditions represent definite sources of mechanical irritation within the joint, and if after a reasonable period of bandaging and bathing the symptoms due to these features persist, they should be removed by operation. After such an operation the normal function of the joint should be expected, as the disease is not a progressive one, and as there are no destructive changes in which the bone or cartilage is involved.

The second type: The *atrophic arthritis*, or, as it was designated in the earlier papers, rheumatoid arthritis, is a progressive disease resulting in marked distortion and great crippling, with the essential pathological feature one of atrophy in which the joint membranes, the cartilage, the bones, and in the exposed joints, even the skin, all show the change. It is because of this atrophy which is such a constant factor that the term atrophic arthritis is used, and it represents an attempt to use terms for which there is some scientific reason.

The disease is characterized in the beginning by swelling of the affected joint (Fig. 1), this representing an increase in the synovial fluid, with, at the same time, an infiltration of the membranes and the periarticular structures. At this time or in the very beginning of the disease, the joint

structures show signs of atrophy, and this can usually be demonstrated even thus early with the radiograph, the absence or the partial absorption of the cartilage between the bones showing clearly. As the disease progresses the atrophy becomes more marked, until it is shown by all of the structures involved in the articulation (Fig. 2), and at times the bones are so much affected that one telescopes into the other (Fig. 3), or dislocations or other deformities result. The small atrophied joint (Fig. 4), in the end result, is in marked contrast to the hypertrophic type. In the stage of swelling there may be a distinct villous change of the synovial membrane, but this disappears as the atrophy develops, unless the disease is arrested before it reaches that point.

The disease is a slowly progressive one, the extension going on gradually for many years. It may attack several joints in the beginning, or it may be entirely confined to one joint and remain as a non-articular process for several months before the signs of progression appear. The large or small joints may be the first affected, but the finger joints are almost always affected very early in the disease. In the fingers the first row of phalangeal articulations are affected before the others, forming the spindle-shaped swellings, but the last row, even though they may ultimately become ankylosed and go through all the changes of atrophy, rarely appear swollen. (Fig. 1.) Any or all of the joints may be affected as the disease progresses, and the jaw is frequently involved, resulting in difficulty in the mastication of the food and consequently interfering with the nutrition.

The etiology of the condition is not known. Some of the features strongly suggest a trophic change, as if the condition were due to some lesion of the nerve centres, but as yet there are no pathological data to support such a theory. The examination of the blood usually shows little abnormal. There may be a slight anemia, but this is not marked, the secondary anemia which is seen in the infectious arthritis not appearing in this type. The lymphatic glands are not enlarged.

The treatment is the treatment that would be suggested by the pathological condition as it is found. Anything that will improve the general tone or tend to lessen the progressive atrophy is of value. Tonics, fresh air, stimulating bathing, forced feeding, massage and all other similar measures should be encouraged. The diet should be a generous one, and meat should be an important factor, whether red or white being immaterial. In general the patient should be given as much food as can be digested. It should be borne in mind during the forced feeding that as the result of the general inaction the eliminative functions are apt to be sluggish, and for this purpose large amounts of water should be given, and possibly some mild alkali. At times the salicylates are of benefit, but if used it should be remembered that large doses depress and therefore do harm, while small doses, such as five grains once or twice daily, will give relief if the drug is to exert any

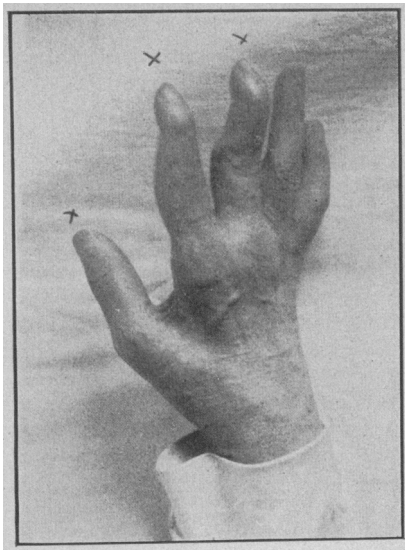


FIG. 1.—Atrophic arthritis: showing the spindle swellings of the early stage.



FIG. 2.—Atrophic arthritis: showing the general bone atrophy with the absorption of the articular cartilage between the bones.

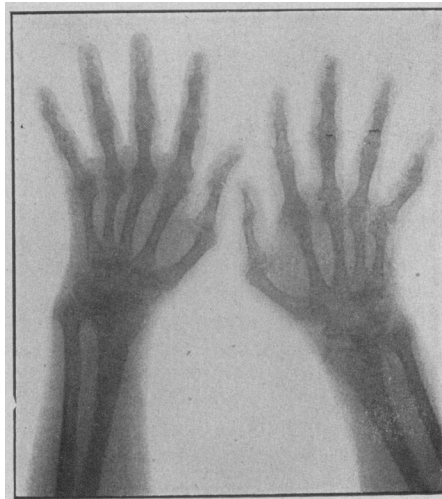


FIG. 3.—Atrophic arthritis: showing the absorption of the cartilage with the telescoping of the bones at the metacarpophalangeal articulations.

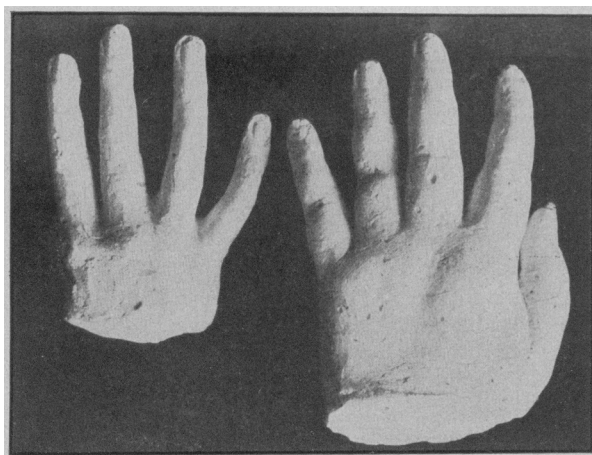


FIG. 4.—Atrophic arthritis: showing the small ankylosed joints as the end result in the severe cases.

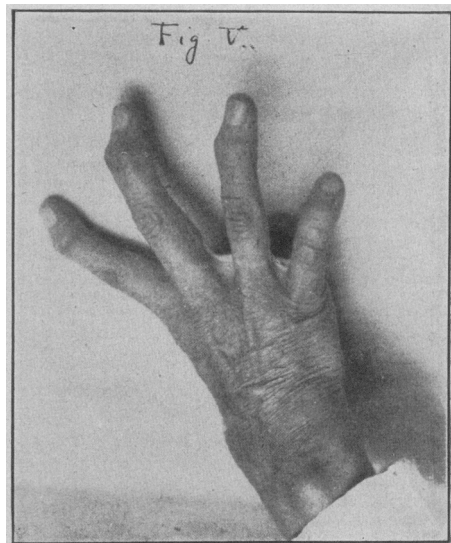


FIG. 5.—Hypertrophic arthritis: showing the Heberden's nodes.

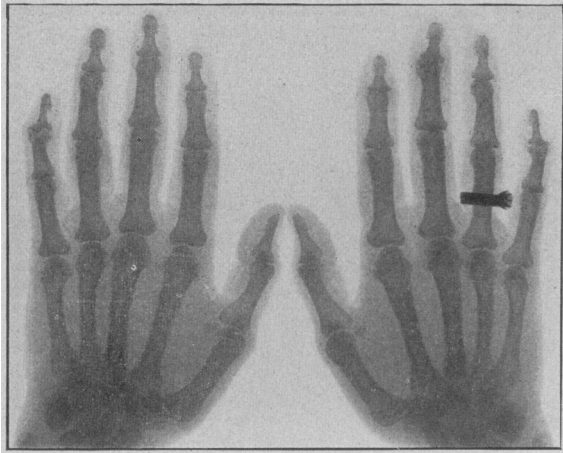


FIG. 6. — Hypertrophic arthritis: showing the hypertrophy at the edge of the articular cartilage in the distal row of articulations.



FIG. 7. — Hypertrophic arthritis: showing the hypertrophy at the edge of the articular cartilage.

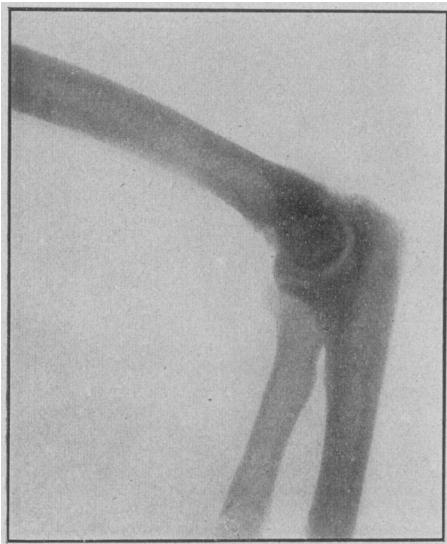


FIG. 8. — Hypertrophic arthritis: the thickening at the edge of the cartilage of the ulna explaining the limitation of motion.

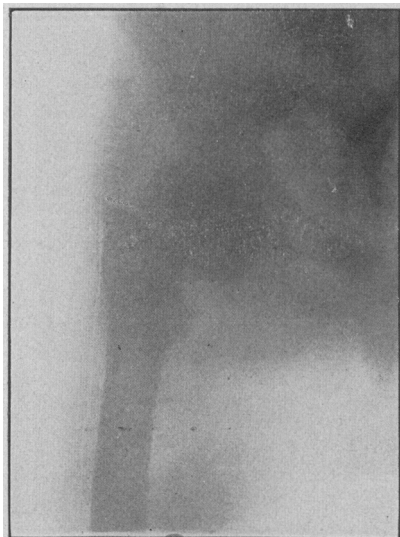


FIG. 9. — Hypertrophic arthritis in the hip
— or malum coxae senilis.



FIG. 10. — Hypertrophic arthritis.

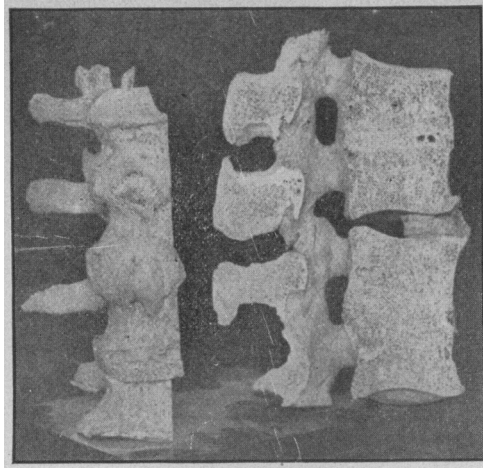


FIG. 11.—Hypertrophic arthritis: showing the fusing of some of the vertebrae with the lipping of the cartilage in an intermediate joint.

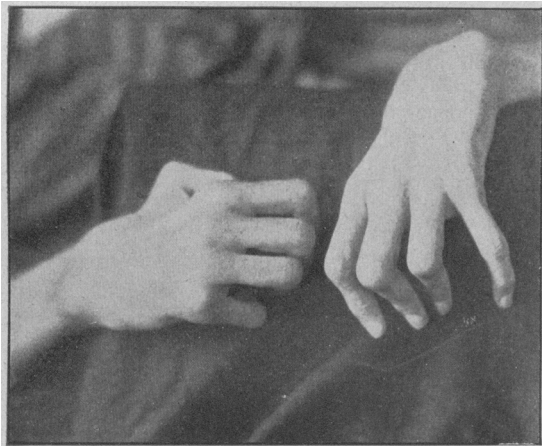


FIG. 12.—Infectious arthritis.

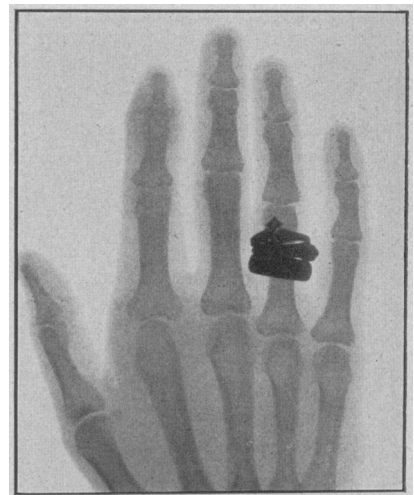


FIG. 13.—Infectious arthritis: showing a long existing lesion in the index finger without atrophy of cartilage or bone.

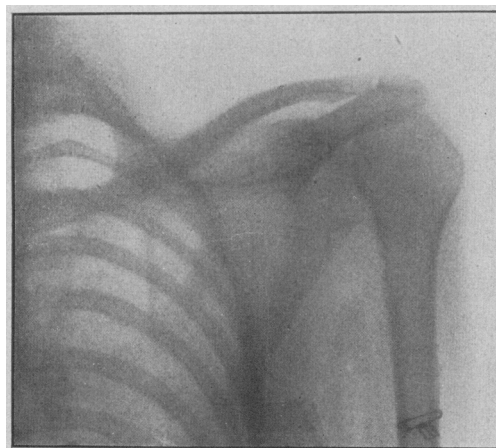


FIG. 14.—Infectious arthritis: showing a process having gone on to ankylosis without atrophy or hypertrophy.

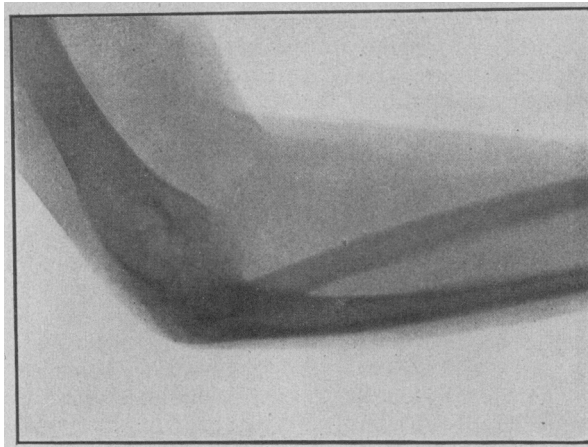


FIG. 15.—Infectious arthritis: showing the result after severe type with suppuration.

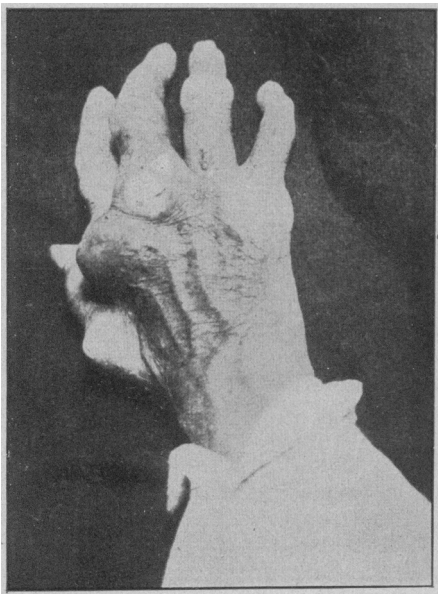


FIG. 16.—Chronic gout: the urate of soda deposits resembling the hypertrophic nodes.



FIG. 17.—Chronic gout: the bone change showing best in the index finger with the complete destruction of the last phalanx of the middle finger.

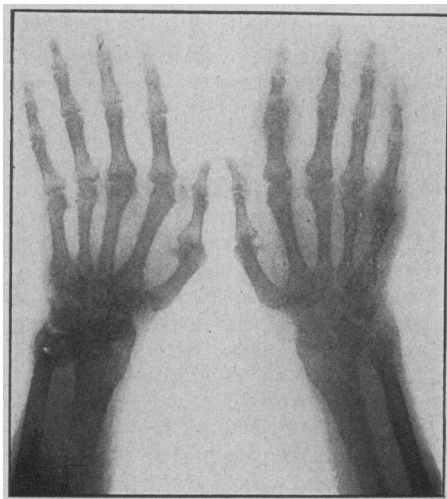


FIG. 18.—Chronic gout: showing the destruction in the shaft of the bone and also the bone adjacent to the joint.

influence. Locally, the treatment is entirely stimulating, with the encouragement of use, stimulating bathing, hot air, massage, and anything that tends to improve the nutrition or circulation of the affected part. In order to make use of the affected part more possible, light bandages, and at times splints, may be of assistance. If adhesions have formed, or if deformities have resulted, they should be overcome, and an attempt made to restore the part to as near its normal condition as possible.

The prognosis in this type of disease, if the environment can be controlled, and if the general treatment can be carried on for a sufficient length of time, is fairly good. In a considerable number of cases the disease can apparently be arrested; in many of the others, while the arrest of the disease does not seem to be possible, its virulence can be greatly modified.

The third type: The *hypertrophic arthritis*, or, as it was designated in the earlier papers, the osteo-arthritis, may be either a local or a general process, and is characterized by a thickening at the edges of the articular cartilages or at the attachment of the ligaments, forming ridges or nodes which become ossified, and interfere in varying degrees with joint motion. As the process extends, the ends of the bones forming the articulation usually become sclerosed and are much more dense than normal; and with this the central portions of the articular cartilage at the points of pressure may be absorbed, representing apparently a process analogous to the decubitus seen in other parts of the body from continued pressure. The essential feature of this type of disease is hypertrophy of the cartilage and bone. It is for this reason that the new term is used.

In the finger joints the Heberden's nodes are the type. (Fig. 5, Fig. 6.) In the knee (Fig. 7), elbow (Fig. 8), hip (Fig. 9), shoulder, or other similar joints, motions are limited by the presence of the thickened bone, and there is, as a rule, little discomfort unless the part is used enough to cause pressure upon this newly formed tissue. At times the thickening is so great as to press upon the nerves passing through or over this area, and results in severe pain. In the spine the process usually starts in the cartilage and follows the anterior lateral ligament upon one side (Fig. 10) more than the other, at times simply limiting motion by the presence of the nodes, at other times actually fusing the vertebræ together with a complete ankylosis. (Fig. 11.) With the thickening which goes on at the front of the spine, there is usually some thickening or swelling which extends around to the side, and not infrequently this presses upon the nerve roots with resulting referred pain. As the process is always more active upon one side than the other the referred pains are usually one-sided, and many of the persistent sciaticas, the intercostal neuralgias, or the brachial neuralgias are to be explained in this way.

In connection with the spinal process, the costo-vertebral articulations are frequently involved with resulting acute pain upon coughing, sneezing

or sudden movements of these joints, and with frequently complete ankylosis of these articulations as the final result. This interference with the use of the upper portion of the lungs in respiration renders them more liable to tuberculosis, and consequently is an important factor in the prognosis.

In any of the joints during the active or irritative stage the synovial membranes are thickened and may undergo the villous formation. If this is so, as is true wherever the villi form, they are most numerous near the articulation, and with the swelling which results the membrane at times extends in or over the cartilage, forming a pannus, and wherever this persists for any length of time in this or in any type of joint disease, the cartilage under the pannus is more or less absorbed.

The etiology in this type of disease is not known, but cold, exposure, strains or other injuries are undoubtedly factors of importance. The examination of the blood shows no special change, nor does the analysis of the urine.

The treatment consists of fixation, or at least protection of the affected part during the active or painful stage, with the idea of preventing the irritation which would result mechanically in the use of the part. In the spine jackets or braces at times are necessary to control the movement; in the mild cases webbing or canvas belts or corsets may be sufficient. In the hip complete fixation, such as can be obtained with a plaster of Paris spica bandage, may be necessary, or flannel bandages or other milder measures may, at times, give the needed support. In the other joints the same principles are involved; in the severer cases, complete fixation; in the milder ones protection or guarding of motion. During the active stage, aside from the fixation and protection, such treatment as tends to lessen the irritation and inflammation is of advantage. The hot air, hot bathing, "sweating" with rubber and such measures undoubtedly relieve and hasten recovery. After the acute process has subsided in certain of the joints, it is possible and desirable to remove the thickened nodes in an attempt to restore the joint to its normal function. In the elbow and knee this is most often desirable. In the hip, the amount of thickening usually makes it better, if operation is to be considered, to remove the entire head of the femur, rather than to attempt to remove the individual nodes.

Internal treatment is of comparatively little importance, except as symptoms arise or as the eliminative functions need supervision.

The fourth type: The *infectious arthritis* is by far the most common, and includes most of the cases commonly spoken of as acute or chronic rheumatism and as septic arthritis, as well as many formerly spoken of as arthritis deformans.

This type of disease apparently results from the presence within the body of some infectious organism, the symptoms being due either to the presence of the organism itself within the joint, or to some toxin produced by that organism in some other part of the body. It may result from

practically any of the infectious or pus-producing organisms, and the type of the lesion or its character will naturally depend upon the special organism involved. The disease may be mild and of short duration with a complete recovery, or it may be severe with much suffering and at times fatal termination. One joint may be affected, and if so the disease in this joint may be very slight or may go on to considerable destruction of the articulation. On the other hand, many of the joints may be involved; at times all of the joints in the body, and, as when the single joint is affected, there may be severe, permanent changes, or the disease may soon be over, leaving little to show for its presence.

In this type of disease the onset is usually abrupt, at times symptoms of great acuteness resulting within a few hours. At other times the process is more insidious and gradual, some weeks being required for its development. It is, however, quite characteristic of this general class of disease, whether mild or severe, of abrupt onset or gradual development, that the joints that are affected become so at practically the same time, there being very little tendency to the progression of the disease or later involvement of the other joints, in marked contrast to the steady progression seen in the atrophic type. In the cases in which there is progression or later manifestations of the disease, the manifestations are in the nature of acute exacerbations, due undoubtedly to the liberation of a fresh supply of the toxin from the original or some other source.

With this type of disease the symptoms are those of an infection, the elevated temperature, the acceleration of the pulse, the general enlargement of the lymphatic glands and the spleen, the increase in the leucocytes in the beginning, with the secondarily developing anemia, together with the joint condition in which the swelling and appearances are of an inflammatory nature, all suggest such a theory. The severity of the symptoms naturally depend upon the severity of the infection.

At times the organism itself may be present within the joint, and whenever this is the case the symptoms are much more severe, and not infrequently marked destructive changes result. Here as with practically all of the other features, the extent of the destruction depends upon the organism present. Occasionally, in a given case, many of the joints may show the changes, suggesting a toxemia, but in some one or two joints the organism itself may be present, producing in those joints the more serious destructive changes, while the other joints in which the symptoms were those of a toxemia recover with less, or entirely without, impairment of the joint function.

The result of the infection in a given case must necessarily depend upon the organism from which the infectious element is absorbed. Any organism may apparently cause such changes, and undoubtedly there are many others yet to be discovered which are responsible for the symptoms in certain cases. If due to the typhoid bacillus,

the joint process may consist simply of a toxemia with a slight increase of temperature, with a serous exudate into the joint, and with recovery in a short time leaving no permanent change in the joint function. The same organism may, on the other hand, be present in the joint in pure culture causing severe destructive changes, resulting in deformity showing in the spine as a well-marked kyphosis.

That which is true of the typhoid bacillus is true also of the other organisms. The pneumococcus, the streptococcus, the staphylococcus, the gonococcus, the influenza bacillus, the dysenteric bacillus, etc., may all produce a toxemia with joint changes which would be in keeping with such a condition, or they may be present in a given joint in pure culture, producing more serious lesions. The pneumococcus and the streptococcus, as is true with the typhoid bacillus, may cause marked destructive changes of the bones as well as of the soft parts. The gonococcus, on the other hand, rarely leads to bone changes, but is associated with much thickening of the capsule and interference with joint function. It is possible that a similar condition may result from the tubercle bacillus, but it seems more probable in the tubercular cases that the joint symptoms suggesting "rheumatism" are due to toxins which result from some of the other organisms which are almost always present with the tubercle bacillus (the so-called mixed infection) in the last stage of tuberculosis, the stage when the so-called rheumatic symptoms are most seen. It is also possible, and indeed probable, in the light of recent reports, that organisms have been found or will be found which will explain some of the cases which, up to the present time, have been shown to be undoubtedly infectious, but in which the definite organism was not known.

In infectious arthritis, the pathological process is a local inflammation; the joint is swollen; the capsule, if the inflammation has lasted for any length of time, is thickened, giving the spindle-shaped swellings in any exposed joints (Fig. 12), but with practically no change in the bone or cartilage (Figs. 13 and 14), unless the process is of the destructive nature, in which case the mere extent of the destruction would make the recognition of the condition easy, or unless with the swelling of the membranes a pannus has formed extending in over the edge of the cartilage, in which case the cartilage under the pannus may be absorbed. The bones are of normal density; the cartilage is present and of normal thickness, and although the joints may be ankylosed, the ankylosis is due to the adhesions which have resulted as a part of the inflammation. (Fig. 14.)

In case there are the more destructive changes, in the repair there may be new bone formed about the joint and true ankylosis result, but the appearances are entirely different from the atrophic or rheumatoid arthritis, and also the hypertrophic or osteo-arthritis, with which, because of the marked thickening, the condition in this stage would be most apt to be confounded. In infectious arthritis the new formation of bone is similar

in every way to the new formation of bone which follows a septic osteitis or periostitis. It is not a thickening of bone at the edge of the cartilage, but thickening or growth of bone at the point of infection wherever present, with complete ankylosis in the severe cases (Fig. 15.)

The blood in infectious arthritis in the beginning and during the active stage shows an increase in the leucocytes with usually a high percentage of hemoglobin. As the disease progresses and the acute symptoms subside the increase of the leucocytes gradually disappears, and the percentage of hemoglobin becomes less, so that in the later stages of the disease a secondary anemia is almost invariably present.

The lymphatic glands are almost always somewhat enlarged in the beginning of the process, and this enlargement remains until the toxemia has been overcome, when it gradually and entirely subsides.

The urine is not peculiar unless the infectious process be quite profound, in which case the characteristics are simply those of a septicemia, and what is true of the kidneys is true also of the other organs.

The treatment of infectious arthritis must be considered in two parts, that which pertains to the general condition and that which is required for the local process. It is of the first importance to keep up the general health as much as possible, and for this purpose all the details of general care should be observed, as they would be carried out in a case of septicemia. In the very beginning, if the disease be acute, with much fever, naturally the diet should be restricted, but after this period has passed it should be wholesome and generous, with the idea of increasing the general strength and nutrition as much as possible. In the mild cases, with good general care, recovery may take place entirely without the aid of drugs, but if drugs are to be used tonics and reconstructives are indicated. In the early stages in many of the cases salicylic acid or some of its compounds will be of distinct help to relieve pain, but in case this drug is to be used it should be borne in mind that in many of the cases it affords no relief whatever, and also, if it is to be of help, that the improvement will be noticed within a short time. It should also be borne in mind that although it relieves pain it is a distinct depressant, disturbing both the action of the heart and the digestion, and if continued for any considerable length of time is distinctly harmful. For this reason, in case salicylic acid is to be used it should not be continued for more than a few days, after which in the majority of cases it is possible to entirely dispense with it, using instead some of the simple alkalies. At the same time the use of large quantities of water internally is of advantage as it is undoubtedly essential that the eliminative functions, both from the kidneys and the bowels, should be kept as near the normal standard as possible. Aside from this, the medication should be planned with reference to the infection, and tonics and reconstructives should be used freely with fresh air, stimulating bathing, and any such measures as improve the body tone.

For the local treatment in the active stage there is comparatively little to be done other than to protect the affected joint, and by means of hot applications, either moist or dry, liniments and such remedies, to relieve the discomfort as much as possible. If the process be acute, fixation will undoubtedly give relief, and this can be accomplished by the application of some form of splint, or a pillow folded about the leg and held with straps. At times complete fixation is necessary, in which case the plaster of Paris bandage is the most satisfactory. In arranging the position of the joint during this active period, the danger of contractures or dislocations should be borne in mind, and after the inflammation has passed, in case any stiffness or impairment of use remains, passive motion, manipulation and massage should be used in order to restore the joint to its normal function as soon as possible. In case the joint lesion represents a toxemia the recovery is rapid, so that within a week or two the acute symptoms have passed and motion should be encouraged. If the infection prove to be of the more serious type in which the organism itself is present in the joint, more radical measures are frequently indicated. The infiltration of the capsule seen in this more severe type of the disease and which is responsible for the impairment of motion in many of the cases, particularly those due to the gonorrhoeal infection, does not take place to any marked degree until after the first three or four weeks. Up to that time the infection and swelling are confined largely to the joint itself. For this reason, if the improvement is not marked at the end of the first three or four weeks, in case only one or two of the joints are involved, they should be opened and thoroughly washed out. The same principle holds in the cases of this nature in which many joints are involved, but as in these cases the virulence of the process is less severe, measures as radical as incision are rarely necessary. In some cases, especially those due to the presence of the pneumococcus or the streptococcus, the symptoms may develop so rapidly and indicate so definitely an active septic process in the joint that there can be no question but that the joint should be opened at once and thoroughly drained, it being frequently possible in this way to prevent the marked destructive changes which otherwise would take place.

In many of the cases of infectious arthritis and even those which are quite mild, after the acute swelling and sensitiveness has passed, instead of the joint returning to its normal size and function some swelling persists and the joint remains sensitive, weak and uncertain for an indefinite period. This condition is due to the villous arthritis or to the fact that in certain cases the fibrin in the synovial fluid is precipitated, and after the swelling goes down these masses of fibrin remain and act within the joint as foreign bodies, producing irritation and symptoms exactly as would any other foreign body. Both of these conditions should be definitely recognized, and removed if necessary.

If, as is not infrequent, the patients are seen

for the first time after the acute symptoms have passed and after the thickening of the capsule has resulted, and the contractures or the other undesirable features have taken place, an effort should be made to overcome them; and every possible effort made to restore the joint to as nearly as possible its normal condition.

The fifth type: *Chronic gout* is less understood than the other types because much less common, and no attempt is made in designating it to use more than a descriptive term, the pathology being too little understood. In the few cases studied the essential characteristics are the same, the chief ones being deposits of the urate of soda in the soft structures about the joints, with some bone absorption adjacent to the deposits.

The disease is usually slowly progressive with periods of acute exacerbation, the intervals between the attacks varying greatly; and during these intervals the progression of the disease ceases. With each exacerbation the symptoms may reappear in the part previously affected, or may appear in some new region. The disease seems to be entirely different from the more common conditions known as acute gout, in which the process is much more acute, the great toe joint being the part commonly affected and with no permanent changes resulting. The deposits when present may resemble or suggest the nodes seen in the hypertrophic form (Fig. 16); but instead of being attached to the bone and being firm to pressure they are soft and can be moved about in the soft structures entirely without connection with the bone. After the deposits have become of considerable size they soften down and discharge, much as a tubercular abscess is formed, and the discharge from these openings, which looks like tubercular pus, is made up entirely of the urate of soda. While this deposit is forming or is being discharged from the various sinuses, the elimination of the urea by the kidneys is naturally decreased in amount.

Of the bone changes the lesion is a local one, but considerable portions of a given bone may be affected, so that in the fingers or toes almost an entire phalanx may be destroyed. The process involves only a small portion of the bone at a time, gradually extending into the rest of the shaft, and when first seen the destroyed portion appears sharply defined (Fig. 17), as if punched out, looking not unlike the appearance of the bone in the syphilitic dactylitis.

The shaft of the bone or the ends may be the portion first affected, but if the end of one bone is affected the end of the adjacent bone is also usually affected, resulting in the destruction of the articulation. (Fig. 18.) In this latter condition the appearance in the radiograph suggests at first glance the atrophied and disintegrated bone of the atrophic type, but on close inspection the difference should be apparent. It is not a simple atrophy, the bone being thin with the preservation in large part of the outline, but is a destruction or disintegration of the bone, so that there is none there to preserve the outline.

When seen in the shaft of the bone, the process

may start in one side, or work in from both sides, and in either manner the whole of the affected shaft may be destroyed. (Fig. 17.) The disintegrated bone is thrown off through the sinuses which are always present where such a process is going on, from which in the beginning the pure urate of soda was discharged.

In the repair of such a condition after the acute attack is over the deposits cease to form, and the joints or bones which have been affected, while always imperfect, yet, nevertheless, do soon recover and are of much greater use for function than one would suppose.

The etiology of these cases is not known, and comparatively little is known in regard to the treatment. It represents a type which apparently must be recognized, but about which much work must be performed before the cases can be treated intelligently. Rest in bed during the active part of the attack is desirable, and the quiet with any form of local warmth to the affected part relieves the pain. "Sweating" with rubber tissue or flannel seems to be particularly helpful. The diet should consist largely of liquids and soft solids during the acute stage, with forced feeding after the attack is over. All during the acute stage large amounts of water should be taken to correct the scanty flow of urine, which is always a feature at this time, and at regular intervals thereafter the amount of the urine should be watched, as before the onset of an acute attack the quantity is diminished and can be corrected by increasing the amount of liquid ingested. The diet should in general be a nutritious one, and if the eliminative functions are kept at the proper standard there is no reason why meat or other nitrogenous foods should not be used.

For drugs, colchium or the salicylates seem to be the most valuable to cut short the attack, after which tonics are indicated.

ARTHRITIS DEFORMANS.*

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THE need of a thorough investigation of the chronic non-tubercular affections of the joints has for a long time been evident. The confusion in the literature of the subject is in itself a sufficient evidence of this. It is, however, a question in the present state of our knowledge whether a generally accepted terminology is possible. As the subject is looked at from different points of view and as the pathology as yet is not understood, an agreement in opinion among observers has not yet been reached.

Although in the past year a number of cases, nearly a hundred, have been under careful observation by the staff at the Long Island Hospital in Boston, great difficulty was encountered in classifying the cases observed, sharply, in the subdivisions of atrophic and hypertrophic. The cases were typical ones; many of them, before taking refuge in the Long Island Hospital, had

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