

CHAPTER XXIV.

THE JOINTS.

EXAMINATIONS OF THE JOINTS.

A. *Methods and Data.*

- I. By *inspection* and *palpation* we detect:
 1. Pain, tenderness, and heat in, near, or at a distance from the joint.
 2. Enlargement:
 - (a) Hard, probably bony.
 - (b) Boggy, probably infiltration or thickening of capsule and periarticular structures.
 - (c) Fluctuating, probably fluid in the joint.
 3. Irregularities in contour:
 - (a) Osteophytes or "lipping" (attached to the bone).
 - (b) Gouty tophi (not attached to the bone).
 - (c) Constriction-line opposite the articulation.
 - (d) Protrusion of joint-pockets in large effusions, filling out of natural depressions.
 4. Limitation of motion:
 - (a) Due to pain and effusion.
 - (b) Due to muscular spasm.
 - (c) Due to thickening or adhesions in the capsular and periarticular structures.
 - (d) Due to obstruction by bony outgrowths or gouty tophi.
 - (e) Due to ankylosis.
 5. Excess of motion (subluxation).

6. Crepitus and creaking.
 7. Free bodies in the joint.
 8. Trophic lesions over or near a joint (cold, sweaty, mottled, cyanosed, white, or glossy skin, muscular atrophy).
 9. Sinus formation, the sinus leading to necrosed bone, to gouty tophi, or abscess in or near the joint.
 10. Distortion and malposition, due to contractures in the muscles near the joint, to necrosis, to exudation, or to subluxation.
 11. Telescoping of the joint with shortening (limb, toe, finger, or trunk).
- II. By *radioscopy* we investigate:
1. Bony outgrowths, their shape, extent, and position.
 2. Necroses and atrophies of bone, their extent and position.
 3. The structure of the bones in and near the joints.
 4. The presence of lesions in the articular cartilages.
 5. Free joint bodies, their presence and position.
- III. *Indirectly* we may gain valuable information about the joints by noting:
1. General constitutional symptoms, their presence or absence. These include fever, chills, leucocytosis, glandular enlargement, albuminuria, and emaciation.
 2. Tuberculin reaction, its presence or absence.
 3. Disease of other organs, their presence or absence, *i.e.*, syphilis, tuberculosis, tabes, and other chronic spinal-cord lesions, endocarditis, hæmophilia, various acute infections (gonorrhœa, influenza, scarlatina, septicæmia), and skin lesions (psoriasis, purpura, hives).
 4. The course of the disease and the results of treatment.

B. *Technique of Joint Examination.*

(a) *Enlargement* is generally unmistakable, but when there is much muscular atrophy between the joints the latter may seem enlarged by contrast, when in fact they are not.

(b) *Fluctuation* is obtained in most joints, as in any part of the body, by pressing a finger on each of two slightly separated spots

in the suspected area, and endeavoring to transmit through the intervening space an impulse from one finger to the other. Fat or muscle will also transmit an impulse, but less perfectly than fluid.

In the knee we test for "floating of the patella" over an effusion by surrounding the joint with the hands, which are pressed slightly toward each other to limit the escape of fluid in either direction, and then *suddenly* making quick pressure on the patella with one finger. If we feel or hear the patella knock against the bone below and rebound as we release the pressure, fluid in abnormal quantity is present.

(c) *Irregularities of contour* are easily recognized, provided the normal contour is familiar.

(d) *Bony outgrowths* may be obvious (as in Heberden's nodes), but if within the joint they may be recognized only by the *sudden arrest of an otherwise free joint motion* at a certain point. In many cases radioscopia is necessary.

(e) *Gouty tophi* are identified positively by transferring a minute piece to a glass slide, teasing it in a drop of water, covering with a cover glass, and examining with a high-power dry lens and a partly closed diaphragm. The sodium biurate crystals are characteristic.

Fluid or semi-fluid exudates in joints may fill up and smooth out the natural depressions around the joint, or, if the exudate is large, may bulge the joint pockets; in the knee-joint four eminences may take the place of the natural depressions, two above and two below the patella.

(f) *Limitations of motion due to muscular spasm* are seen with especial frequency in tuberculous joint disease, but may occur in almost any form of joint trouble, particularly in the larger joints.

(1) *Hip-joint*, two forms of spasm are important: (1) That which is due to irritation of the psoas alone (*psoas spasm*); (2) that in which *all the muscles* moving the joint are more or less contracted.

In pure *psoas spasm* the thigh is usually somewhat flexed on the trunk, though this may be concealed by forward bending of the latter. Very slight degrees of psoas spasm may be appreciable only

when, with the patient lying on his face, we attempt hyperextension (see Fig. 220).

The other motions of the hip—rotation, adduction, abduction, and flexion—are not impeded.

General spasm of the hip muscles is tested with the patient on the back upon a table or bed (a child may be tested on its mother's

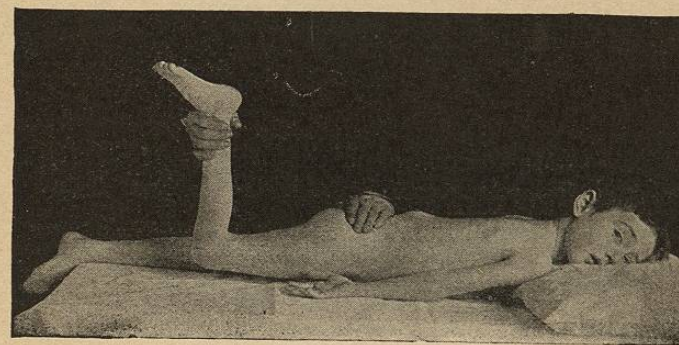


FIG. 220.—Testing for Psoas Spasm. (Bradford and Lovett.)

lap) and the leg flexed to a right angle, both at the knee and at the hip. Using the sound leg as a standard of comparison, we may then draw the knee away from the middle line (abduction), toward and past the middle line (adduction), and toward the patient's chest (flexion). Rotation is tested by holding the knee still and moving the foot away from the median line of the body or toward and across it.

(2) *Spinal column*. Muscular spasm of the muscles guarding motion in the vertebral joints can be tested by watching the body attitude (a stiff, "military" carriage in most cases), and by efforts to bend the spine forward, backward, and to the sides.

In most cases we can make out limitation of these motions by asking the patient to stand with knees and hips stiff and then bend his trunk (of course, naked) as far as he can in each of the four directions. If we are familiar with the average range of motility

in each direction and at the different ages, this test is usually easy and rapid. Backward bending is the least satisfactory, and in doubtful cases the patient should be on his face, while the physician, standing above him, lifts the whole body by the feet (see Fig. 221).

(3) In the joints of the shoulder, knee, elbow, wrist, ankle, toes, and fingers, there is usually no difficulty in testing for muscular spasm, and no special directions are needed.

To distinguish muscular spasm from bony outgrowth as a cause of limited joint motion, we should notice that bony outgrowths (*e.g.*,

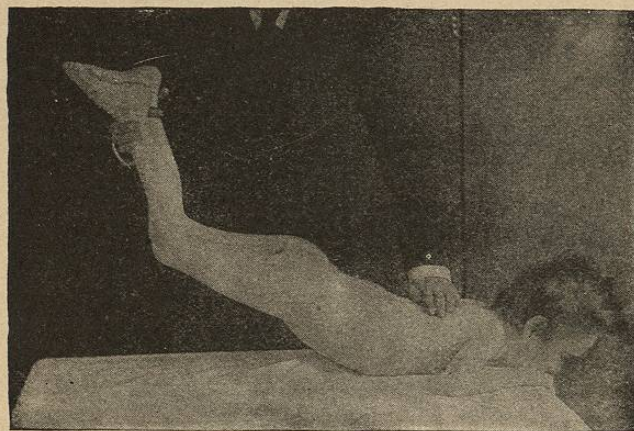


FIG. 221.—Rigidity of Spine in Pott's Disease.

in the hip) allow perfectly free motion up to a certain point; then motion is arrested suddenly, completely, and without great pain. Muscular spasm, on the contrary, checks motion a little from the outset, the resistance and pain *gradually* increasing until our efforts are arrested at some point, vaguely determined by our strength and hard-heartedness and by the patient's ability to bear the pain.

Motions limited by capsular thickening and adhesions are not, as a rule, so painful after the first limbering-up process is over. There is no sudden arrest after a space of free mobility, but motion

is limited from the first and usually in all directions, though the muscles around the joint are not rigid. The possibility of more or less limbering-out after active exercise (or passive motion) distinguishes this type of limitation.

In true ankylosis, there is no motility whatever.

(g) *Excessive motion* in a joint is recognized simply by contrast with the limits furnished us by our knowledge of anatomy and of the physiology of joint motion at different ages. When the bone and cartilage appear normal or are not grossly injured, we call the excessive motility of the joint a *subluxation*, but excessive motility may also be due (as in Charcot's joint) to destruction of bone and other essentials of the joint.

(h) To detect *crepitus* and *creaking* we simply rest one hand on the suspected joint, and with the other put it through its normal motions, while the patient remains passive.

(i) Most *free joint bodies* are not palpable externally, and are recognized only by their symptoms, by the *x-ray*, and by operation.

(j) *Shortening of a limb* as evidence of joint lesions is tested by careful measurements. The vast majority of such measurements are made with reference to the *hip-joint*. The tip of each anterior superior iliac spine is marked with a skin-pencil, and likewise the tip of each inner malleolus. Then, with the patient lying at full length on a flat table, the distance from anterior superior spine to inner malleolus is measured with a tape on each side.

The method of obtaining the other data tabulated on page 486 needs no explanation, except the radiosopic technique—a subject which I am not competent to discuss.

C. Joint Diseases.

I shall use the classification proposed by Goldthwaite and divide joint diseases as follows:

1. Infectious arthritis: (a) Tuberculosis. (b) Other infections.
2. Atrophic arthritis: (a) Primary. (b) Secondary to organic nerve lesions (Charcot's joint).

3. Hypertrophic arthritis.
4. Gouty arthritis.
5. Hæmophilic arthritis.

Under *infectious arthritis* are included all varieties of articular "rheumatism" and the joint troubles symptomatic of gonorrhœa, of streptococcus infections (including scarlet fever), influenza, syphilis, typhoid, and other fevers. As tuberculosis is an infection we must include it in this group, although the disease begins usually as an osteitis and involves the joint secondarily by extension.

I. *Tuberculous Arthritis*.—The characteristics of joint tuberculosis are:

(a) *Slow progress*, with gradual enlargement and disabling of the joint.

(b) *Muscular spasm*, especially in disease of the hip or vertebræ.

(c) Evidences of *low-grade inflammation* (moderate heat, swelling, pain, and tenderness).

(d) *Abscess and sinus formation*.

(e) *Malpositions* (e.g., shortening of one leg in hip-joint disease, angular backward projection in spinal disease, subluxations in the knee-joint).

(f) *Bone necrosis*, as shown by *x-ray*.

The order of frequency in the different joints is as follows: spine, hip, knee, wrist, shoulder (tuberculous dactylitis is described on page 50).

In the deep-seated *hip-joint*, diagnosis has to depend largely on *shortening* and on the presence of *limitation of all the hip motions* by muscular spasm (see above, page 489), unless the disease is of long standing and manifests itself by *abscesses* burrowing to the surface. Usually these abscesses point in the upper anterior thigh, but they may open behind the great trochanter, below the gluteus maximus, or at any point in the vicinity of the hip.

Besides muscular spasm, shortening, and abscess formation, we get some aid from the general and vague joint symptoms present in this as in many other joint lesions: Such are enlargement (felt as thickening about the great trochanter), muscular atrophy, pain, tenderness, and crepitus.

In *spinal tuberculosis* (*Pott's disease*) the distortion of the bones with formation of a knuckle in the back is often obvious and practically diagnostic. In other cases we depend on muscular spasm or abscess formation. The muscular spasm gives a stiff back and often psoas contraction (see below). The abscess is peculiar, in that it usually works along in the sheath of the psoas and points in the groin below Poupart's ligament (see Fig. 202); less often it appears in the back or in the gluteal region, and rarely it may invade almost any part of the body (lung, gullet, gut, peritoneum, rectum, hip-joint, etc.).

Psoas spasm, which is common both in hip and spinal tuberculosis, is by no means peculiar to these diseases, and it is worth remembering that it may be due to various other lesions, such as:

(a) Hypertrophic arthritis of the spine.

(b) Appendix abscess.

(c) Perinephritic abscess.

In the peripheral joints (shoulder, elbow, wrist, finger, knee, ankle) the diagnosis of tuberculosis rests on the chronic enlargement and disability, with abscess and sinus formation.

Hysterical or acute traumatic lesions (with or without neurosis) may present symptoms and signs identical with those of tuberculosis. Decision is aided most by: (a) The lapse of time and the effects of treatment. (b) *x-Ray* examination. (c) The predominance in functional and traumatic cases of pain and tenderness rather than muscular spasm or malposition.

II. *Acute Infectious Arthritis*.—All varieties are distinguished from the other types of arthritis by: (a) *The absence* of any marked *bone lesions*¹ in most cases. (b) *The tendency to recovery* in the great majority of cases.

The milder forms, whose cause is unknown, we have hitherto designated as "*rheumatism*." The others are distinguished as gonorrhœal, pneumococcic, syphilitic, influenzal, dysenteric, etc., according to the organism producing them.

Between this group and those known as "*rheumatism*," there is

¹ Exceptionally, virulent infections (especially those due to pneumococci or streptococci) may destroy cartilage and bone and end in true bony ankylosis.



FIG. 222.—x-Ray of Hand in Atrophic Arthritis. Note that the rays pass through the articular ends of the bone without resistance (hence no shadow there). (Carson.)

no clear pathologic distinction. Mild infection with pyogenic cocci may leave a sound joint, though the general tendency is to crippling through fibrous adhesions. On the other hand, arthritis of "rheumatic" (*i.e.*, of unknown) origin may end in suppuration, crippling the joint with adhesions, though in most cases it leaves a sound joint.

All the members of the infectious group of joint lesions present the *local signs of inflammation* and the *constitutional signs of infec-*

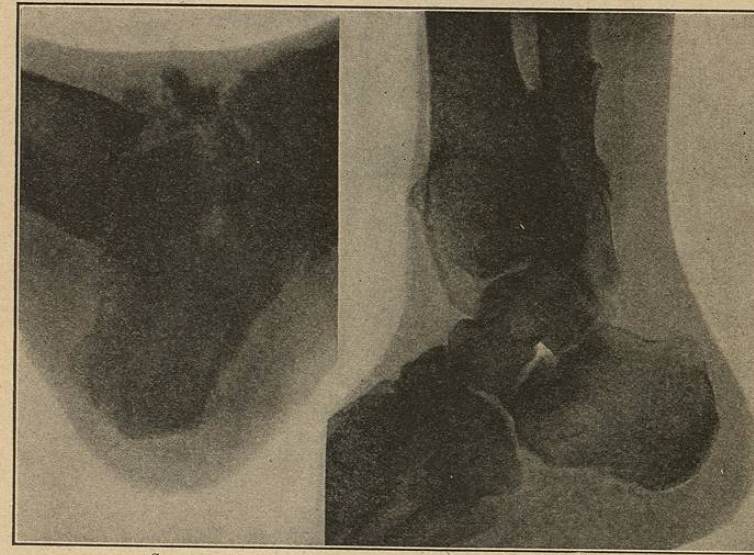


FIG. 223.—*a*, Charcot's Joint with Loose Bodies; *b*, Pulmonary Osteo-arthropathy.

tion. All may be complicated by endocarditis, but in those of unknown origin ("rheumatic") this complication is especially common. There is no bony hypertrophy, bone destruction,¹ sinus formation, or marked irregularities of contour. A general enlargement (more or less spindle shaped, owing to periarticular thickening and muscular atrophy) is the rule. The joint motions are

¹ See note on page 493.