

which at the same time is an example of how a superficial sign may point to a deep-seated process. As Pott's disease most frequently begins along the anterior surface of the bodies of vertebræ, under the anterior longitudinal ligament, the inflammatory destruction of the bone progresses more rapidly at this site. The weight of the head presses most heavily on the anterior part of the bone, which gradually assumes a wedge-shaped form, narrow in front, wider behind. The vertebræ immediately above and below necessarily rest upon two planes converging anteriorly, and the spinous process of the diseased vertebra must become unduly prominent. If the body of the diseased vertebra can be reached through the mouth, it will be found painful on pressure.

Distinct prominence of a spinous process is noticed only in fairly advanced cases, in which the vertebra is decidedly wedge-shaped—that is, considerably eroded anteriorly. In the early stages there exists only a lessening of the concavity of the neck (lessening of the physiological lordosis of the cervical segment).

The cervical spine is found almost straight, which virtually represents a curvature with its convexity directed posteriorly (kyphosis).

2. The further course of these cases may lead to the formation of retropharyngeal abscesses. These produce difficulty in breathing and swallowing, and can be readily palpated as elastic swellings in the posterior pharyngeal wall.

3. Symptoms referable to more distant parts lend further support to the diagnosis. The inflammation in the vicinity of the intervertebral foramina causes disturbances along the distribution of the spinal nerves,

due partly to mechanical pressure, partly to the extension of the inflammation along the nerves themselves.

Experience has shown that the disturbances are rarely motor. As a rule, they are neuralgic pains: occipital or cervical neuralgias, if the disease is located in the upper cervical region; brachial neuralgias, if in the lower. If the tubercular process is situated in the lateral portion of the vertebra (the articular processes or intervertebral joints) the picture does not conform to this type.

(a) On one side of the neck an enlargement of the bony parts is perceptible; the bone is also painful on pressure. This apparent thickening of the bone, noticed on palpation, is largely due to a swelling of the soft parts attached to the bony structures.

(b) Or the infiltrated portion of the cervical spine is at the same time longer, so that the diseased side must become *convex*, the healthy, concave. The cervical part of the column has a lateral, bow-shaped curvature, and the head is bent to one side. If the process has already advanced to the stage of destruction the opposite condition may result. The eroded portion becomes shorter, the cervical spine is *concave* toward the affected side, and the head is rigidly inclined toward the diseased side. It is always on the diseased side that changes in the bone are demonstrable; in the first case, thickening and pain, in the second, destruction and the symptoms of abscess. These abscesses, which in unilateral cases form to either side of the median line, point either in the lateral region of the neck above the clavicle or appear in the axillary region, after burrowing along the large fascial opening through which the axillary vessels and nerves pass into the axilla.

(c) In other cases rotation of the spine takes place. The painful and enlarged part becomes somewhat prominent anteriorly, and in some cases we can feel, by palpation through the mouth, that the bodies of the vertebræ are more prominent on one side. Occasionally a



FIG. 1.

small, steplike projection can in these cases be felt between the bodies of two vertebræ. The seat of the tuberculosis is then most probably in the intervertebral joints.

Both in tuberculosis of the bodies and of the joints of the vertebræ the rigid carriage of the head is the dominant symptom. We may suspect the disease as soon as the patient enters the door. He turns his trunk

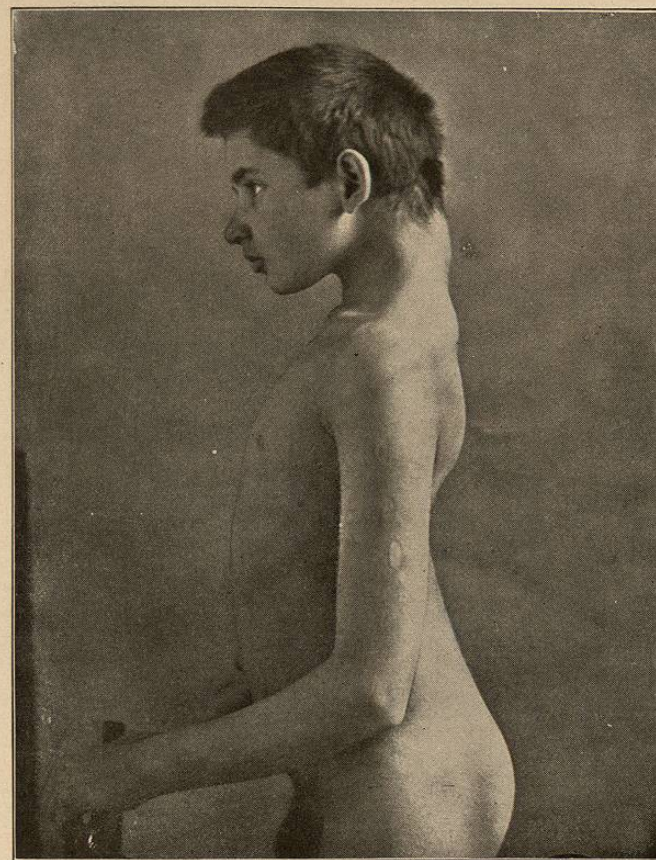


FIG. 2.

when he desires to look to the side, holding the neck stiff and immobile (see Figs. 1 and 2).

In that disease which Leyden has proposed to call *Rust's disease*, a peculiar position of the head is noticed.

This disease is merely a special kind of Pott's, a caries of the *uppermost cervical vertebræ*, more particularly a caries which occurs in the joint between atlas and the odontoid process. It well merits a special name and description, not only because carious erosion of the vertebræ in the neighbourhood of the vital centres of the spinal cord cause the most serious dangers, but also because the symptoms of the disease are highly interesting, and permit of the probable diagnosis with considerable certainty. As turning movements of the head take place in a horizontal plane about the vertical odontoid process of the axis, the head and atlas moving as one, it is evident that as a result of the inflammation of this joint turning movements of the head are entirely inhibited. Nodding movements take place in the joint between atlas and the occipital bone, and these are only partially or not at all impeded. Loss of the power of turning the head, with persistence of nodding movements, are, therefore, a diagnostic guide. The patient himself furnishes a further clew by supporting his head with *his hands* on changing from the sitting to the recumbent posture, and vice versa.

Some patients even lift the head by the hair when they attempt to rise. In some unknown way they divine, or unconsciously avoid, the danger which a sudden movement might occasion. In the end most of them meet a sudden doom through dislocation or fracture of the odontoid process and consequent crushing of the cord.

A further hint of great value in making a prognosis, if the other symptoms lead us to suspect the trouble, is furnished by the absence of all external signs. This points to the deep location of the disease.

Leyden has shown that the same symptom-complex is present when the odontoid process is the seat of *Carcinoma* or *Sarcoma*, with the exception that in malignant disease the pain does not abate when the parts are at rest. This disease is found in adults, and is very rare. It has been previously stated that in case of fracture the head is likewise fixed by means of the hands during all sudden movements.

With this the discussion of the bone diseases which cause abnormal positions of the head is completed.

Turning now to the muscular apparatus, we find at least *one* symptom to rely upon. The contracture of a muscle will not cause *immobility* of the head and of the cervical column, but merely a definite *limitation of movement* in some one direction. In contracture of the sterno-mastoid, for example, we meet with distinct resistance to those movements which put the muscle upon the stretch. In other directions movement will remain normal. This is the basis of our reasoning in determining whether the obstacle is situated in muscle or in other structures.

Of all the muscular diseases which cause a pathological position of the head, the contracture of the sterno-mastoid is the most frequent and most interesting. The condition is known as *Caput obstipum*, or *Torticollis*. In unilateral contracture of the sterno-mastoid the ear of the diseased side approaches the shoulder, and, at the same time, the chin is turned toward the sound side. Besides this, the occiput is bent slightly backward. If the presence of the other symptoms of this disease are taken for granted, it is necessary to determine from the standpoint of differential diagnosis whether, in any given case, the contracture of the muscle is primary or

secondary. A cured Pott's disease can cause a similar posture due to a scoliotic distortion of the cervical column. In these cases the sterno-mastoid likewise stands out as a firm, cordlike structure, because its points of insertion have for a long time been approximated, and a real contracture or shortening has resulted. In some of these cases a single glance will suffice to make the correct diagnosis. If, with a rigidly prominent sterno-mastoid, the head is bent toward the same side, but the chin *not* turned toward the opposite one, we immediately suspect that the case is not one of primary contracture. This suspicion should be verified by examining the spine for the presence of deformity and for the degree of limitation of movement, in order to determine the presence of some healed bone lesion. If the contracture is primary, all movements, in which the sterno-mastoid is not put upon the stretch, are unimpeded. This wry-neck is purely *muscular*, and almost without exception congenital in origin, due either, *ante partum*, to some strained position of the head of the fœtus in utero, or to *intra partum* tearing or inflammation of the muscle.

In cases of contracture of this muscle occurring in adults, another point of doubt may arise. We may suspect some disease of the cervical spine; for there are cases of *spondylitis deformans*, analogous to *malum coxæ*, in which distortion of the neck is the final outcome. Here there is pain in the joints of the cervical portion of the spine, increase in size of the articular processes, and, not infrequently, cracking sounds on motion. Do not let an *hysterical* woman mislead you, for in this disease cramps and contractures of the sterno-mastoid occur, and during examination of the cervical

column the patients complain of pain. In such cases, however, there is a disproportion between the high degree of contracture and the slight and varying amount of pain. The vertebral column is not at all deformed, and other signs of hysteria are present.

I was called to examine an eleven-year-old girl in whom one physician diagnosed Pott's disease, and another muscular spasm. The head was bent so strongly toward the right that the cheek rested upon the shoulder. Examination of the neck showed the spinous processes of some of the vertebræ slightly sensitive to pressure, but nothing else was to be found. It was impossible to move the head from its abnormal position, the patient complaining of intense pain at each attempt. Consequently I was unable to examine the muscles of the affected side for spasm. The physician who supported the diagnosis of muscular spasm gave as his reasons that the girl was strongly built, not anæmic, and free from hereditary taint. The girl really was well-built and muscular. He further stated that this high grade of contracture had developed in the course of a very short time; that no deformity or destructive process was demonstrable in the spine, and that the painful points changed their location. I was obliged to agree with these findings. After several months, the spasm disappeared. Later it was discovered that the father of the girl—an unusually neurotic subject—had suffered from the same trouble in his youth.

There are other neuropathic contractures of the neck muscles. The site of these contractures is indicated by the tense state of the contracted muscle. Contracture of the *trapezius* causes the head to turn toward the diseased side and to bend backward; the shoulder is somewhat elevated and pulled inward. In tonic spasm of the *splenius capitis*, the head is likewise bent toward the affected side, inclined backward, and the chin approached to the shoulder of the same side. Bilateral spasm of the sterno-mastoids causes the head to sink down upon the breast; spasm of the deep muscles of the neck bends the head backward.

The following example will show of what importance recognition of the significance of the position of the head may prove to be:

I was substituting for my teacher, v. Dumreicher, in Vienna, when I was informed that a child, urgently requiring tracheotomy, was about to be carried in. I immediately interrupted the lecture, and the child was introduced. Its breathing really indicated a high degree of stenosis of the air-passages. The most natural thing to think of was croup. But the child did not show the retraction of the head usually seen in croup. On the contrary, the head was bent forward and kept in this position without the slightest movement. This circumstance, combined with the pale looks of the child, caused me to suspect, at the first glance, that the dyspnoea might be due to caries of the cervical spine, with retropharyngeal abscess. Without delay I palpated the neck, and discovered a prominent spinous process. I now passed the fingers of my left hand into the child's mouth, and found an elastic bulging of the posterior wall of the pharynx. Introducing a knife, I opened an abscess, the whole incident occupying only a few seconds. The dyspnoea rapidly diminished, and I now had leisure to explain my actions to the students.

CHAPTER II

INJURIES TO THE SKULL AND BRAIN, AND THEIR PRIMARY SEQUELÆ

THAT the final outcome of injuries of the skull can never be predicted with any certainty has been known from the earliest times, and is a fact which still holds good. Severe penetrating wounds, complicated by crushing of large areas of brain substance, may heal without leaving any after-effects or any disturbance of the bodily functions. On the other hand, a blow on the head, which does not cause the victim to fall to the ground but which produces a small wound of the soft parts, may rapidly lead to erysipelas, meningitis, and death. In recent times antisepsis has proved a blessing in these cases, when applied at the right time, by preventing the appearance of suppuration. I have made these preliminary remarks in order to indicate in advance that in wounds of the skull—just as in wounds of the thorax and abdomen—antiseptic measures must precede all attempts at arriving at a more accurate diagnosis.

Injuries to the skull may be divided into:

1. Injuries of the soft parts.
2. Injuries of the bones of the cranium.
3. Injuries of the intracranial contents (brain, meninges, blood-vessels, nerve-trunks).