

nature of the changes in the part will lead to a correct judgment on the point. There are, however, some practical points in relation to some of the individual joints which require notice.

Anchylosis of the lower jaw is very rarely true; its diagnosis is difficult, and absolutely necessitates the administration of an anæsthetic; it often depends upon cicatrices in the mouth. (See page 391.)

Anchylosis of the shoulder is very common, but is almost invariably *false*, and is very often *extra-articular*. Owing to the extreme mobility of the scapula, and the large share it takes in the angular movements of the arm, the patient, and even an incautious surgeon, may be misled as to the degree of stiffness present. To test the point, the surgeon should rotate the arm with one hand, while the other rests firmly on, and fixes the scapula. As the scapula takes no share in this movement, any rotation that is possible must be at the humero-scapular joint; the rotation must not be violent, especially when a joint has long been stiff, or it may cause fracture of the neck of the humerus.

Anchylosis of the elbow is more often true. It only needs to point out that flexion and extension may be seriously limited by plastic material or bone filling up the coronoid or olecranon fossæ, or by out-growths from the coronoid or olecranon processes; the radio-ulnar joint participates in intra-articular ankylosis of the elbow. In cases of sudden limitation of flexion of the joint at a right-angle be careful to ascertain that the head of the radius is not displaced forwards.

Anchylosis of the wrist is most frequently *extra-articular*, caused by adhesion of the tendons in their sheaths; this is known by the accompanying limitation of the movements of the fingers and thumb, parts quite at a distance from the original injury or disease.

Anchylosis of the digits is most often due to *whitlow* and tendinous adhesions, or to *arthritis deformans*.

Anchylosis of the hip may be due to *arthritis deformans*, but is more often the result of *strumous arthritis*. Care must be taken to fix the hip bone by firm pressure while attempting passive or active movements, for where the joint is rigid the normal movement at the lumbar spine becomes increased; as in the shoulder, rotation movements are the most reliable.

Anchylosis of the knee.—The patella is the most convenient bone to examine for mobility; if it can be moved laterally to any degree it shows that it is not ossified to the femur, and this is very strong evidence that the ankylosis between the tibia and femur is also *false*. Subluxation of the tibia backwards, or rotation of the bone outwards, or marked flexion of the joint, are strong evidence of intra-articular disease.

Anchylosis of the ankle is very often *extra-articular*, being frequently seen after fractures near the joint, or in bad sprains. When it is of long standing and complete, the tarsal joints become unusually mobile.

Anchylosis of the tarsus is most often *intra-articular* and *true*. It may exist on the outer side of the foot in connection with old standing talipes varus. In the joint of the great toe it is usually due to gout.

Anchylosis of the spine and ribs is mentioned on page 395.

CHAPTER XXIV.

DIAGNOSIS OF DISEASES OF THE HEAD.

IN chapter v. the diagnosis of the injuries of the head and their sequelæ is discussed, and we must refer the reader to that chapter for information on the

subject of hæmatoma, hernia cerebri, pulsating collections of blood or cerebro-spinal fluid under the scalp, erysipelas, and cellulitis. In this chapter we shall consider only those affections of the scalp, pericranium, and vault of the skull, which are not traumatic in origin. Of these, the most important for diagnosis are the various tumours here met with, and they will accordingly be considered first.

A. Tumours of the head.—The surgeon should first of all inquire whether the tumour was *noticed at birth* or soon after, or at a later period; the congenital tumours of the head are hæmatoma (*see* page 77), meningocele, encephalocele, nævus, and dermoid cyst; the last two are often not observed until shortly after birth; those developing later in life are nodes, cysts, exostosis, sarcoma, and epithelioma. The next fact to be ascertained, and this is the most important of all, is whether the tumour *communicates with the cavity of the cranium*, and of this there are five signs: *fixity to the bone, reducibility, pulsation, the detection of an aperture in the skull, and the existence of cerebral symptoms.* Tumours which are not fixed to the skull are certainly not intracranial; but many extracranial tumours are fixed to the bone. Try whether the tumour is partially or wholly *reducible* by gentle pressure; if it be, it is either a protrusion of the cranial contents or a vascular tumour, and if after reduction the skull be felt entire beneath it, it is certainly the latter. A solid tumour communicating with the cavity of the skull is quite irreducible. *Pulsation* is a sign common to some collections of blood or cerebro-spinal fluid under the scalp (*see* page 82) to hernia cerebri (page 96), and also to aneurism by anastomosis, encephalocele, and pulsating tumours of the bone or dura mater. If the pulsation be stopped by compression of the arteries of the scalp, it is certainly an extracranial

tumour. If controlling these arteries has no effect upon the pulsation, it shows that it is due to the throbbing of intracranial or cranial vessels. In some cases an *aperture in the skull* may be plainly felt, or the finger may detect a depression in the bone around the base of the swelling. The presence of *cerebral symptoms*, convulsions, paralysis, or coma, is strong evidence of the intracranial nature of a tumour, but many tumours communicating with the interior of the skull are unattended with such signs. As a result of his examination, then, the surgeon may be able to declare some tumours certainly extracranial, others certainly intracranial, and of others it may be impossible to assert whether they communicate with the cranial cavity or not. The surgeon should then note whether the tumour is *solid or fluid, single or multiple, adherent to the skin* or allowing that structure to move over it, its *shape*, and the characters of any *ulceration* associated with it, its rate and mode of *growth, tenderness*, etc. Having completed this examination, he should be able to arrive at a diagnosis as follows:

(1) If a congenital tumour be found adherent to the bone, fluctuating, reducible by gentle pressure with or without the production of cerebral symptoms, and if the bone be felt to be deficient at its base, it is a *meningocele*. These tumours are usually globular in shape; they are most often met with over the occipital protuberance, at the root of the nose, or along the vertex. If tapped, cerebro-spinal fluid escapes. (*See* page 83.) Meningocele is often associated with hydrocephalus.

(2) If a congenital tumour with the general characters of a meningocele be found to pulsate synchronously with the temporal artery, it is known to contain some portion of the brain, and to be a *meningo-encephalocele*. In these cases pulsation may only be detected when the tumour is partially reduced,

as in a case lately under the author's care. The movements of the brain with respiration may be detected, as well as arterial pulsation.

(3) The diagnosis of a cutaneous nævus is obvious. But if a flat soft tumour, which was noticed at or soon after birth, be found beneath healthy or nævoid skin, and if it yield under gentle pressure, becoming fuller and tenser when the child cries or strains, it is a *subcutaneous nævus*.

(4) If the tumour pulsate forcibly, if it be uneven on the surface, evidently consisting of convoluted vessels, through which the firm bone of the skull can be felt, and if large arteries can be traced in the scalp to the edge of the tumour, compression of which stops the pulse in the tumour, it is a *circoid aneurism*. The skin over these tumours is usually hot, and there are no cerebral symptoms. (See also page 302.)

(5) If a non-congenital solid tumour of the skull, which is immovably fixed to the bone and pulsates with an expansile beat, be quite incompressible and irreducible, and if its pulsation be unaffected by compression of the arteries of the scalp, it is a *pulsating sarcoma of the cranium*. The appearance of the tumour may be preceded by severe local pain; it may grow with varying rapidity, and may exhibit the pulsation in places only; sometimes the sign of "egg-shell crackling" is perceived, which makes the diagnosis quite easy. If there are cerebral symptoms, it is to be inferred that the tumour is intracranial; the absence of such signs is no proof to the contrary. Some of these tumours have been described as "fungus of the dura mater."

(6) If the tumour be globular, tense, smooth, and fluctuating, irreducible and devoid of pulsation, it is a *cyst*. Of these, three forms are known, only two of which can be diagnosed. If the tumour be acquired, adherent to the skin, and freely movable over the

bone, it is a *sebaceous cyst*. These are often multiple, are commoner in middle and late life, and they may attain a large size, or become inflamed and ulcerate. If the scalp move over the tumour, and if the latter be partially fixed to the bone, not being freely movable over it, it is a *dermoid cyst*. These may be found at birth or may be only noticed later on, and they are more common in young people. They are most often found near the outer angle of the orbit. They are generally single. Before removing them, the surgeon should examine carefully the bone beneath them, as they are often placed over a depression or even a hole in the skull. A *meningocele*, the pedicle of which has become occluded, could not be diagnosed with certainty from the above, unless it were tapped and the fluid examined. If the tumour were of large size at birth, the surgeon should suspect meningocele, and tap the tumour to clear up the diagnosis.

(7) If, in an infant, low rounded firm swellings of the bone are found grouped around the anterior fontanelle, but not extending quite up to it, they are the "natiform swellings" of Parrot, and are due to *congenital syphilis*; the surgeon should examine carefully for *craniotabes*, and also for other manifestations of this inherited taint.

(8) When, in later life, low, smooth, or uneven swellings of the bone are found, which are painful and tender, firm or fluctuating, they are to be diagnosed as *syphilitic nodes*. These vary much in their condition. In some the pain and tenderness are extreme. Some are hard and bony, others softer, and others again fluid. They may be single or multiple. Little pits in the bone may be felt between elevated ridges; in other cases the skin is ulcerated, and gummatous material or sequestra are exposed. They are favourably influenced by treatment, and are associated with other evidence of syphilis.

(9) A prominent, clearly circumscribed tumour fixed to the bone, of absolute hardness, of very slow growth, or stationary, and quite uninfluenced by any treatment is an *exostosis*. This may be accompanied by cerebral symptoms indicating that the tumour is partly intracranial. Such a tumour may be cast off as a sequestrum.

(10) A circumscribed tumour fixed to the skull, solid, firm, irreducible by pressure, and of steady growth, is to be diagnosed as a *sarcoma* of the bone. These tumours vary in their rate of growth; they may exhibit "egg-shell crackling" at some part of the surface which will greatly facilitate the diagnosis. If there are cerebral symptoms it must be inferred that the tumour is partly intracranial.

(11) If there be an ulcer of the scalp with thick everted edges, and a dirty sloughy or fungating base discharging very foul-smelling fluid, careful inquiry must be made as to its mode of origin. If it be found that it began as a chronic globular tumour which became inflamed and burst, and especially if there be sebaceous cysts in the scalp, or the connected lymphatic glands are not enlarged, it is to be recognised as an *ulcerated sebaceous cyst*. Such an ulcer may easily be mistaken for a malignant sore.

(12) If, on the other hand, it be found that the ulcer began as a small wart or crack, which gradually extended, and the edge be firm and adherent to the pericranium or bone, and if the lymphatic glands at the angle of the jaw or behind the ear and sternomastoid be enlarged and hard, it is to be diagnosed as an *epithelioma of the scalp*.

B. Of the remaining affections of the head little need be said. In infants, the skull should be examined for *craniotabes* and for signs of *ricketts*. If any part of the skull (not a fontanelle or suture) be found to yield under the finger, having the resistance of

parchment rather than of bone, the condition is known as *craniotabes*. Such softened spots are most often found in the parietal bone behind the parietal eminence; they are generally associated with congenital syphilis, but may be due to rickets.

If the head be found flattened behind with the forehead prominent, and the fontanelle widely open or open too long, and the bones are thickened along the sutures, it may be described as a *rickety skull*. The anterior fontanelle should not be palpable after twelve months of age.

When the head of an infant or young child is found to be disproportionately large and continually increasing in size, with wide separation of the cranial bones and perhaps distinct fluctuation perceptible from suture to suture, it will be at once recognised as a case of *hydrocephalus*. It has been said that if the disease be congenital, and the eyes be prominent owing to depression of the roof of the orbit, it is *hydrocephalus interna*; but if the disease come on after birth, and especially if the eyes be unaffected and there be a history of injury, it is *hydrocephalus externa*. This distinction is of little, if any, practical value.

The detection of the crusts or scabs of *eczema impetiginodes* of the scalp, or of "nits" or mature *pediculi*, which should be sought among the roots of the hairs, will at once establish a diagnosis.

If an adult find that he constantly has to get a larger hat, or by other signs a general increase in the size of the skull is verified, the affection will be recognised as *hypertrophy of the skull*. If at the same time, or subsequently, the long bones of the extremities become enlarged and curved, and the stature diminished, the disease will be recognised as *osteitis deformans*. This is a very chronic affection attacking persons past middle life. (See page 315.) If there

be an ulcer of the scalp, and at its base hard dry rough bone be felt and seen, the case is one of *necrosis*; and if the disease be spontaneous and chronic, and the bone be found pitted and uneven on the surface, it is *sypilitic* disease of the cranium. This diagnosis will be corroborated by finding nodes on the skull or other evidences of this dyscrasia. The surgeon must be careful to distinguish mere exposure of the cranium from its necrosis. By wounds or cellulitis portions of bone are often exposed, smooth, hard and dry, but after a time the bone may be seen to be pink in colour and then gradually granulations sprout through its surface and the wound heals over. It is only when this does not take place, but on the contrary the surgeon has evidence of the separation of a sequestrum in the formation of a groove around the exposed bone, or by its black colour, and the length of time it remains without undergoing the above change, that he must diagnose it as dead. When, however, the surgeon has rough diseased bare bone exposed in an ulcer, the disease having originated in the bone, the diagnosis of necrosis is clear from the beginning.

When the side of the head above the ear is swelled, hot, reddened, acutely painful and tender, and tight closure of the jaws or wide opening of the mouth is painful, *abscess beneath the temporal fascia* is to be suspected. If the surgeon detect fluctuation the diagnosis is certain. As an abscess in this region demands early opening, it will be well, in the absence of fluctuation, to introduce a grooved needle or small syringe to clear up the diagnosis. A high temperature, shivers, and sweating will confirm the suspicion of abscess. The swelling is tense and boggy, and has the limits of the temporal fascia, not extending down on to the face or neck, but there may be œdema of the eyelids on the same side.

CHAPTER XXV.

DIAGNOSIS OF DISEASES OF THE JAWS AND GUMS.

The acute affections of the jaws are inflammatory, and the most frequent is alveolar abscess. Whenever, therefore, a patient presents himself with an acute, painful, and evidently inflammatory swelling of the face, over either jaw bone, the first thing for the surgeon to do is to seek for evidence of alveolar abscess. By gentle pressure let him find the seat of most acute tenderness, and observe whether the swelling is there fixed to the bone; next he should examine the teeth, looking first of all for carious stumps and for pus escaping by an alveolus, and then he should tap each tooth in succession with a small metal hammer to detect whether any one of them is tender to sharp vertical pressure. Passing his finger between the lip and the gum he will feel for swelling over the alveoli. If he find the swelling fixed to bone, and one tooth very tender to pressure, probably also decayed with swelling over its alveolus, he will diagnose *alveolar abscess*. These abscesses may point at some distance from the diseased tooth which gives rise to them. When, however, the swelling is very extensive, especially if it involve the body and ramus of the lower jaw, and there be no evidence of its connection with an individual tooth, or several teeth be found loosened, raised from their sockets and very tender, it must be diagnosed as *acute periostitis*. There is generally high fever in this condition.

An *acutely inflamed gland* below the lower jaw may closely simulate either of the above affections, but it will be found to be movable over the bone, or

there will be a history that at the commencement of the swelling it was thus movable.

The chronic affections consist of *necrosis*, *periostitis*, and the various *tumours* of the bones. The most constant evidence of necrosis is the presence of one or more sinuses, and if these are found they must be carefully probed, and if a sequestrum is felt the diagnosis of *necrosis* is to be made. The sequestrum may be either the fang of a tooth or part of the bone; in the former case the sinus is usually single, in the latter case there are often many sinuses and much thickening, or even the development of a bony involucrum around the sequestrum. The surgeon must bear in mind that a sinus in connection with a tooth may open at some distance from the sequestrum, on the face, the neck, the palate, or into the nose. In all these cases, therefore, the teeth must be carefully examined for caries, and for any tenderness, and suspicious teeth should be drawn. But where there is great thickening around the jaw, or the probe leads to the ramus or body of the lower jaw, or a large sequestrum is seen in the mouth, it is *maxillary necrosis*. The most extensive variety of this is *phosphorus necrosis*. (See page 392.)

When the surgeon recognises that he has to deal with a tumour of the jaw he should first decide whether it is inflammatory in nature. If the swelling be on one side of the bone only (as on the hard palate, or outer side of the lower jaw) painful and somewhat tender, and the patient be the subject of syphilis, it must be considered as *chronic periostitis*; if the swelling subside under treatment, the diagnosis will be confirmed; if it withstand treatment and continue to enlarge it must be regarded as a neoplasm.

Tumours of the jaws.—From the frequent occurrence of cysts in the jaws the surgeon must first try to decide whether any given tumour is solid or

cystic. The outline is to be carefully noted, then fluctuation must be felt for, as well as the yielding of any part of the wall to pressure, with the sensation as of egg-shell crackling or the bending of parchment, and the teeth must be very carefully examined to see whether one of the permanent teeth remains uncut, and this requires the more care, as in such a case the corresponding milk tooth may not be shed. A smooth globular or ovoid outline of a tumour, its slow gradual painless growth in a young person, and the absence of one of the teeth, are strong points in favour of a tumour being *cystic*; if to these signs there be added fluctuation or "crackling," the diagnosis is certain; but if these signs are absent the surgeon should insert a small trocar, and examine the contents of the swelling; this will at once clear up its nature. If the cyst be single, and the fluid be thick and mucilaginous, containing cholesterine, it is in all probability a *dentigerous cyst*, and the errant tooth must be sought. If, however, the tumour be lobulated, more irregular in outline, it is to be diagnosed as a *multilocular cyst*. These are most common in the lower jaw, and they are often connected with decayed teeth.

Solid tumours are to be distinguished from each other by the same rules as in other situations. (See chapters xvi. and xix.) The surgeon will be able to diagnose *osteoma*, *fibroma* (which is a central growth and probably should be grouped as a sarcoma), *periosteal* or *central sarcoma* and *chondro-sarcoma*.

In the upper jaw the relation of a tumour to the **antrum** is a matter of particular interest. The antrum is explored by examining its walls, and if necessary by tapping the cavity with a trocar. Distension of this cavity causes a bulging of its outer wall below the orbit and malar bone, a flattening or depression of the roof of the mouth, a raising of the floor of the orbit, causing protrusion or other displacement of the eye-ball, and,

when extreme, blindness, and obstruction in the nasal fossa of the same side with epiphora; the expansion of its cavity may take place especially in one or other of these directions, but it must not be diagnosed unless more than one of its walls is found bulging. Distension of the antrum may be caused by empyema of the antrum (slight), the growth of cysts into the cavity, and especially by solid tumours, bony, sarcomatous and cancerous.

In the case of large tumours the surgeon must endeavour to ascertain whether the tumour is limited to the jaw or involves other bones; he should examine the temporal region, the nose, and the bone over the frontal sinuses, for evidence of swelling, and then, passing his finger behind the soft palate, should feel whether the tumour is filling up the pharynx, or is fixed to the base of the skull.

If the antrum appear slightly distended, and the patient complain of a dull aching pain in the part, and of an unpleasant odour in the nostril of the same side, and bad taste in the mouth in the morning, and if, when he lies down on the opposite side, odourless pus streams from the nostril, the surgeon is to diagnose *empyema of the antrum*. (See also page 414.)

When one or other jaw bone, or any of the other facial bones, slowly and progressively enlarges, forming large nodular masses of bone without distinct circumscription, and being quite unmodified by treatment of any kind, the disease is known as *leontiasis*. When advanced, this disease causes the most hideous distortion of the features.

The temporo-maxillary joint. — The most frequent affection of this joint is inability to open the mouth. Where this condition is of acute origin, and attended with severe painful spasms in the muscles closing the jaws, it is acute *spasmodic trismus* or *tetanus*. (See page 72.) Where chronic, the surgeon

must examine to distinguish between three conditions. Putting his finger in the mouth, he should feel if there are any cicatricial bands uniting the bones, and preventing opening of the mouth; if there be, it is *cicatricial trismus*. If the wisdom teeth be uncut, or misplaced, or the molar teeth crowded too closely together, he will recognise it as *reflex trismus* or *chronic spasmodic trismus*. This is the form most often met with in young persons, otherwise healthy. If the surgeon find neither of these causes for the lockjaw, he must characterise it as *anchylosis*, which may be *true* or *false*.

If the patient complain of pain on movement of the temporo-maxillary joint, and a sensation of grating, which may or may not be perceived by the surgeon, and the condyle be enlarged, the diagnosis of *arthritis deformans* should be made.

Acute arthritis occasionally occurs; it is attended with great pain on mastication, swelling in front of the ear, tenderness, and suppuration, the pus escaping through the auditory meatus, or behind the ramus, or into the mouth. The disease may terminate in necrosis of the condyle, or in anchylosis.

Diseases of the gums.—The gums are swollen, spongy, and livid in *scurvy*; the other symptoms of this disease render the diagnosis easy. If the gums are swelled, and the edge surrounding the necks of the teeth is sloughy, and separated from the teeth, enquire as to whether the patient has been taking mercury, or is exposed to the influence of this metal in any way; where that is so it will be recognised as *mercurial gingivitis*; there will be swelling and perhaps ulceration of the tongue, salivation, loosening of the teeth, a metallic taste in the mouth, and marked fetor of the breath. Where, however, there is no mercurialism, and aphthous sores are found on the lips or tongue, it will be recognised as *aphthous gingivitis*.

A *sinus* in the gum should be carefully probed, and the adjacent teeth explored, and if the probe lead down to a hard smooth surface it is probably a fang of a tooth. The probe may, however, pass over a more extensive surface of sequestrum, *necrosis of the alveolar process*. If, on looking into the mouth, the surgeon find the gums receded from the teeth, and the teeth loose or fallen out, and if the alveolar process be bare and exposed, with pus welling up alongside it, he will at once diagnose *necrosis*. This may have resulted from injury in tooth extraction (*traumatic*), or have followed one of the exanthemata (*exanthematic*), in which case it affects the alveolar process only, is often symmetrical, and is insidious in its progress; or it may occur in one exposed to the fumes of yellow *phosphorus*, when the necrosis is apt to involve the whole depth of the bone, and to be accompanied with a great amount of swelling, and in the case of the lower jaw the formation of an ossified shell of new bone around the sequestrum. A sequestrum due to phosphorus poisoning is nearly always rough on the surface, and of a dirty brownish colour. Necrosis of the jaws is also seen as the result of *cancrem oris*.

The remaining affections of the gums may be grouped together as *tumours*. The rapidity of growth, attachment, consistence, and tendency to ulcerate are the facts to be particularly observed in such cases.

Where in an infant or young person the gum is found growing up and overlapping the teeth, or even burying them entirely, and projecting in the mouth as irregular lobed masses of firm tissue covered by healthy mucous membrane, it is a case of *hypertrophy of the gum*. This is a congenital affection, though it may not be recognised until some time after birth; it is often associated with hypertrophy of the alveolar process and premature eruption of the teeth.

If there be a small pedunculated growth from the

gum attached between two teeth, and covered with healthy mucous membrane, it is a *polypus of the gum*. If the growth be papillated or villous on the surface it is known as a *wart*. Similar warts are sometimes seen on the palate or on the tongue.

If a sessile tumour grow from the gum, being somewhat firmly but not immovably fixed to the alveolus, and it is of slow growth, very firm, painless, and covered by healthy mucous membrane, it is a *fibrous epulis*. When of large size the surface may ulcerate from pressure and friction. This is to be distinguished from a polyp by its deeper and broader attachment, and usually its greater size.

But if the tumour be firmly fixed to the alveolar process, have grown more rapidly, and especially when it has a livid colour, a lobed surface, is of soft consistence, and is found to spring from within an alveolus, it must be diagnosed as a *myeloid epulis*.

When the gum of an elderly person is found ulcerated, the ulcer slowly but steadily spreading in all directions, and having an indurated base and everted edge, it is *epithelioma*. Enlargement of the lymphatic glands will confirm this diagnosis.

A very chronic solid enlargement of an alveolus is probably caused by an *odontome* in connection with the fang of a tooth. *Bulbous odontomes* will be recognised by the white nodular enlargement of the crown of a tooth.

CHAPTER XXVI.

DIAGNOSIS OF DISEASES OF THE SPINE.

THE surgical affections of the spine may be classified into those attended with deformity of the spine, disease of the spine without deformity, and tumours over