

of their cortical centre, or if the spasms affect muscles under the governance of centres immediately adjacent to those connected with paralysed muscles. By noticing the distribution of the spasm, an exact diagnosis of the seat of the lesion can be made, and a gradual extension of the convulsions or paralysis from group to group of muscles is characteristic of cortical lesions, progressively implicating neighbouring centres.

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## CHAPTER VI.

### THE DIAGNOSIS OF INJURIES OF THE SPINE.

INJURIES of the spine derive their chief importance from the liability to implication of the spinal cord or of the spinal nerves. Paralysis at a distance from the seat of injury is the great symptom of injury to the cord or nerves, and as, in cases where these parts have been injured, any forcible manipulation may lead to further and serious mischief, the examination should be so conducted as to determine, first, whether the cord or nerves have been injured, and, if so, where; then whether the bones are fractured or dislocated; thirdly, whether the ligaments or muscles have been strained, torn, or bruised; while, last of all, lesions of the skin must be investigated.

1. **Injuries of the spinal cord and nerves** are indicated by *paralysis* and sometimes also by signs of *irritation*; what has been written in reference to these signs of intracranial mischief (page 87, *et seq.*), applies with almost equal force to injuries of the spine. In the investigation of traumatic paralysis for the purpose of diagnosis, two points must receive especial attention, its *extent*, and the *time and mode of onset*

*of the palsy.* By the latter we are able to judge of the actual cause of the paralysis; by the former we are able to localise the lesion.

The *extent of the paralysis* should be carefully determined; the power of voluntary motion, of sensation, and the condition of the various reflexes being separately and systematically investigated. The first use of the information thus obtained will be to decide whether the lesion is situated in the spinal cord, or in the nerves arising from it. Wherever the palsy is complete below a certain horizontal plane, involving both voluntary motion and sensation, it is undoubtedly due to *injury of the spinal cord*. But it requires a very complete crush of the cord to abolish entirely all sensation in the parts below, for if even a small portion of the cord be intact it will suffice to conduct some sensation, and hence it is that complete and absolute loss of sensation is more often met with in cases of injury to nerve trunks. Where the paralysis corresponds to the distribution of an individual nerve or nerves, it is due to lesion of those nerves. But a limited lesion of the cord may produce a limited paralysis of sensation or motion, according to the part of the cord affected; *e.g.* a lesion of the lateral column of the cord may cause paralysis of voluntary motion on the same side without affection of sensation or of the reflexes, and without marked wasting of the paralysed muscles; and similarly, a lesion limited to the posterior column of the cord may cause disorders of sensation without loss of power of voluntary motion. Injuries do not observe the strict regional limitations often found in diseases of the cord.

If paralysis ensue immediately on the receipt of an injury, it is due to some interference with the functions of the part caused directly by the injury, either *concussion* or *crushing*, and the diagnosis between these two will be readily made by

noticing whether the early symptoms gradually or quickly pass off, or remain permanent; in the former case it shows that the injury was not a severe breach of continuity, but only *concussion*, while when the paralysis continues permanently it indicates that its cause was a severe and permanent structural lesion, such as is usually termed a *crush* of the spinal cord. If, however, the paralysis does not ensue immediately on the receipt of the injury, it cannot have been caused directly by it; should the symptoms of palsy supervene after a very short interval, one to be measured at the most by hours, they may be confidently attributed to the effects of *hæmorrhage*; while if they come on after a longer interval, they are caused by *inflammation*, or *myelitis*. It is to be noted also that any increase in the paralytic symptoms is to be similarly explained; that occurring quickly (within a few hours after the injury) being attributed to *hæmorrhage*, while that occurring at a longer interval (after twenty-four or forty-eight hours) is to be attributed to *myelitis*, spreading from the part primarily injured. These rules are exactly the same as those which serve as a guide in the diagnosis of the cause of the nervous phenomena in head injuries.

The observer's knowledge of anatomy will enable him to fix the seat of the lesion of the spinal cord by the extent of the paralysis. But just a few leading points may be here cited. (a) Below the first lumbar vertebra (sometimes twelfth dorsal or second lumbar) the spinal canal contains only the nerves of the *cauda equina*. (b) If there be complete motor and sensory palsy of the lower limbs, with loss of sensation as high as the umbilicus, it indicates a lesion of the cord at the level of the *ninth dorsal vertebra*, or opposite the roots of the tenth dorsal nerve. (c) If, however, the palsy involve the muscles of the belly wall and the intercostal spaces, and the anæsthesia extends up to about the

second rib, and involves also an area on the inner and back part of the skin of the arm, it indicates a lesion of the cord opposite the *first dorsal vertebra*. (d) If the palsy involve also the upper limb, sensation being perfect over the head, face, neck, and just below the shoulder and clavicle, the respiration being solely diaphragmatic, it points to a lesion opposite, or but very slightly above, the *fifth cervical vertebra*.

By noting the state of the "*reflexes*" very important information is obtained. A "*reflex*" may be lost by interruption of its afferent or efferent path, or by paralysis of its centre. When, then, it has been determined that there is a lesion of the cord at a particular level, and there is no evidence of injury to the nerves below, the condition of the reflexes whose centre is in the part of the cord below this level will indicate the functional state of that part of the cord. For example, in a case of crush of the spinal cord by a fracture-dislocation of the fifth cervical vertebra from a fall on the head, if we find that the plantar, patellar, cremasteric, anal, vesical, gluteal, abdominal and epigastric reflexes are preserved, it will indicate that the cord below the lesion is functionally active, and *vice versâ*. It must be remembered that immediately after such an injury as we have supposed, the spinal cord below will be temporarily paralysed by "*concussion*"; but this should pass off in a few hours, and if after this interval the reflexes cannot be obtained, it indicates some more serious and lasting lesion of the centre. This same symptom may of course be used to detect the functional condition of the cord above as well as below the lesion. In estimating the "*reflexes*" under these circumstances, the observer must bear in mind the simple physiological effect of shutting off all volition. For instance, when the finger is passed within the anus of a healthy man, the sphincter contracts by a simple reflex stimulus,

much strengthened by a strong voluntary effort, and therefore in a crush of the cervical cord where all voluntary effort acting upon the rectum is shut off, the anal contraction will be much slower and more feeble, even if the reflex action be perfect. Similarly in micturition; when the bladder is full a stimulus is conveyed up to the micturition centre in the lumbar enlargement of the cord, which is reflected along motor nerves to the detrusor urinæ muscle; but volition also comes into play, and brings other muscles into action, notably those of the abdomen, and sometimes many of those of respiration; micturition so performed is a quick and powerful expulsive effort; but if the voluntary part is shut off the mere reflex act is in comparison slow and feeble. There are certain paralytic phenomena which demand a few words further; we shall notice only those which are constantly coming under the observation of surgeons.

**Incontinence of urine.**—Where the centre in the lumbar enlargement of the cord and the third and fourth sacral nerves are intact, but the path of sensory and motor impressions along the cord above is completely severed, there will be at first retention of urine during the condition of shock or concussion, but when this passes off there will be reflex discharges of urine, more frequent and less forcible than in health, and of which the patient will be entirely unconscious. Should only the motor path in the cord be affected, the patient will be conscious of the passage of urine, but quite unable to influence it, while if only the sensory tract be injured he will in the absence of sensation make no voluntary effort either to restrain or to assist the reflex emptying of the bladder. But if the centre in the cord, or the nerves passing between it and the bladder, be the seat of the lesion, all reflex action is abolished, periodical discharges of urine do not take place, but true incontinence of urine, gradually

becoming absolute, is established, the urine trickling out of the urethra as constantly as it trickles into the bladder, a little lodging in that viscus under the action of gravity, or restrained by the resistance to its discharge offered by the long and doubly curved urethra.

**Priapism** is the name given to the condition of erection of the penis frequently observed in spinal injuries. It may be extreme even to the point of extravasation of blood, but is more often partial and incomplete. It is a sign that the erection-centre in the lower part of the spinal cord is cut off from the inhibiting influence of the higher centres by some intercepting lesion. It is not usually met with in crushes of the lower part of the cord, but in those of the cervical and upper dorsal regions.

**Incontinence of fæces.**—The centre governing the contraction of the sphincter ani is situated in the lumbar enlargement of the cord, and if it and the nerve paths between it and the rectum are intact, the presence of the finger in the anus or of fæces in the rectum will cause reflex contraction of the sphincter. If the cord is crushed above this centre, when the pressure of the fæces becomes increased beyond a certain point, or at an earlier period if they be fluid, the sphincter yields, and a discharge takes place unknown to the patient. This is not true "incontinence of fæces," but merely "*involuntary and unperceived discharge of fæces,*" and the act will be repeated only at distinct and even long intervals. Where the lumbar enlargement of the cord or the cauda equina is crushed, the sphincter ani does not respond to the presence of the finger within that aperture, or of fæces in the rectum, and the expulsion of the latter by peristaltic action is unopposed; as, however, except in the condition of diarrhoea, fæcal matter passes into the rectum only occasionally, we

have not a constant passage of fæces, but from time to time an "involuntary and unperceived discharge of fæces," which becomes specially troublesome only when the evacuations are loose. The student will notice that the distinction between these two conditions, or between the effects of lesion of two parts of the spinal cord, is to be made out by the finger introduced within the anus, and not by noticing the discharge of fæces. In connection with this subject it may be pointed out that the very obstinate constipation which is frequently observed in cases of crush of the upper dorsal or lower cervical spinal cord, while partly to be explained by the paralysis of the abdominal muscles, is probably to an important degree dependent upon damage to centres in the spinal cord, regulating the peristalsis of the various sections of the alimentary canal.

**Bed-sores and alterations in the urine** may be mentioned together, as each is attributable to two classes of causes. Bed-sores coming on after some days are due to the effects of pressure, friction or the irritation of urine or fæces upon the paralysed parts, and are to be obviated by careful nursing. But in other cases large and deep bed-sores form quite early (within two or three days) where such causes can be absolutely excluded, and these are to be attributed to irritative lesions of the spinal cord; but whether they depend upon vasomotor changes, or injury to special "trophic" centres, or are to be ascribed to unusual impulses passing along the nerves, is still a matter for discussion. Similarly the changes in the urine, its alkalinity, decomposition, turbidity, and admixture with mucus, may be attributed to the decomposition of the urine started by and dependent upon micro-organisms introduced by the catheter passed to relieve the retention; and where care is taken to exclude this

accident by aseptic catheterism, such decomposition of the urine can be obviated. But in other cases, there seems to be evidence that in spite of all such precautions, and at an early period after the spinal lesion, nephro-cystitis is set up, with subsequent decomposition of the urine: and this is then to be regarded as a trophic effect. These are the most common nutritive lesions; others less often met with are arthritis and unilateral acute bed-sore dependent upon an irritative lesion of the brain.

As in the case of the brain, injuries of the spinal cord may be attended with symptoms of irritation as well as of paralysis. These are *pain, hyperæsthesia, muscular spasm*, and *excessive reflex irritability*. Where these symptoms occur at and from the time of the injury, they indicate some irritation caused directly by the injury; this may be meningeal hæmorrhage, but it is more often some displacement of bone causing pressure upon a nerve in the intervertebral canal. Coming on at a late period, these symptoms point conclusively to inflammatory irritation; they are more marked in *meningitis* than in *myelitis*, while paralysis quickly results from the latter process. These inflammatory processes vary much in intensity, and often involve both the membranes and the spinal medulla, but the observation of the following signs will enable a diagnosis to be made.

When after an injury the patient experiences severe deep-seated pain in the spine, which shoots down the limbs and round the trunk, the pain being increased by movement, and with this the muscles whose nerves come off from the affected part of the cord are spasmodically contracted, the limbs being rigid, with occasional clonic spasms excited by contact or voluntary attempts at movement, while there is marked hyperæsthesia of the skin, *traumatic meningitis* is to be diagnosed.

When, on the other hand, the pain is less marked, and not increased by movement, but the limbs are paralysed and cold, and rapidly waste, the skin is insensitve, and the superficial and deep reflexes are lost, while bed-sores rapidly form, and the urine becomes putrid, the symptoms are due to *traumatic myelitis*. The chief feature is the paralysis both of voluntary motion, sensation, and reflex action; this is not produced instantaneously, as in crush of the cord; nor very quickly after the injury, as in hæmorrhage into the cord; but more slowly, after an interval to be measured by days, and there is accompanying it general fever, as in other inflammations. *Hæmorrhage into the meninges*, when extensive, may lead to compression of the cord, and so to paralysis; but from the large size of the cavity into which the blood is poured, the paralytic phenomena are gradually and not suddenly induced, while the paralysis *ascends*, affecting first the lower limbs and reflex centres, and gradually spreading upwards; this condition is to be distinguished from myelitis by the paralysis being less marked and complete, as well as by the period of onset and the absence of fever.

When at some interval from an injury the patient complains of pain in the spine, extending round the trunk and down the limbs, accompanied by spasmodic contractions of muscles and painful startings, and various alterations in sensation, numbness and formication, with increase of the reflexes, and these symptoms are gradually succeeded by motor and sensory palsy and loss of reflexes, which slowly creep higher and higher up, the phenomena are those of *chronic meningo-myelitis*.

**2. Injuries of the vertebræ.**—It must not be forgotten that some cases of sudden death from injury are due to crush of the upper part of the cervical spinal cord from fracture-dislocation of the bones, and

when an explanation of the death is not elsewhere found, this region should be carefully explored; very free mobility of the head, with or without crepitus, will further point to this injury.

Where the symptoms of paralysis coming on immediately upon the receipt of an injury to the spine point to crush of the spinal-cord, a *fracture-dislocation* of the bones opposite the injury to the cord, the upper part of the spine passing forward upon the lower, may be inferred. If the lesion be in the cervical or dorsal region, a thorough examination of the spine will not be justifiable, as the injury of the bone is unimportant compared with that of the spinal marrow, and the manipulations requisite to determine the state of the bones are attended with the danger of rendering the crush of the cord more extensive, and of exciting myelitis, which, spreading up, will cause still further and may be fatal paralysis. When, however, the injury is in the lumbar or sacral region, a careful examination of the spine should be made, for there we have the resistant cauda equina occupying the spinal canal; if any displacement of the bones is detected it will be justifiable to attempt its correction. In such a case, then, the patient should be carefully turned well over on to his side or even his face, and the surgeon should pass his fingers steadily down the vertebral spines to determine whether there is or is not any break or dip in their line; and if a marked deformity be detected, efforts may be made to replace the bones. It must be borne in mind that regularity of the line of the spines is no proof of the absence of fracture-dislocation in the face of evidence of crush of the cord or nerves, for the displacement of the bones may have been but momentary, or reduced by subsequent movements.

In cases, however, in which there is no evidence of crush of cord, but where a severe blow has been received on the spine directly, the examination may

be made more deliberately. The patient standing up, the surgeon should examine the lines of the spines and transverse processes to determine whether there is any irregularity, depression or marked lateral deviation, at the injured part, and seizing the spinous processes between fingers and thumb, he should attempt to move each of them laterally to determine whether any one of them is detached.

It is in cases of injury to the cervical spine, and especially of the higher part of it, that the examination becomes most critical; where the cord is crushed the symptoms are unequivocal; but where there is, or is suspected to be, a fracture or a dislocation without crushing of the cord, a complete examination is precluded by the danger of its leading to further displacement with crushing of the cord, and sudden death or rapidly fatal paralysis. Such cases, then, are only to be investigated with the utmost gentleness; pain and rigidity are the symptoms suggesting such an injury, and where the face is turned to one side and fixed in that position, it points very strongly to dislocation forwards of a cervical vertebra on the opposite side. Subsequently, when ankylosis is obtained, the parts may be freely examined, and irregularity of the spines and transverse processes, with perhaps thickening from masses of callus, may confirm the previous diagnosis of a fracture.

**Fracture and dislocation of the coccyx** may be produced by direct violence, falls, kicks, and possibly also in parturition. There is great pain in walking, coughing, and defecation, any act in which the muscles attached to the coccyx come into play. On examining the part externally, irregularity or crepitus may be detected; but if not the finger should be passed into the rectum and the anterior surface of the bone explored; if now a part of the bone be found movable upon the rest, with crepitus, it shows that the bone is

fractured; while, if a marked transverse projection at the base of the bone is felt, it indicates a dislocation; it must then be noted whether the prominence is the lower end of the sacrum or the upper end of the coccyx, and this will decide whether the coccyx is dislocated backwards or forwards.

### 3. Injuries of the ligaments and muscles

are often combined with the more serious lesions we have been considering above; but they are not unfrequent quite apart from them, as a result of sudden and violent twists, blows, and strains of the spine. They are the cause of pain and a certain amount of rigidity of the spine, which often lasts for some time, especially in the case of railway accidents.

Immediately after the accident the symptoms are localised pain and tenderness, with pain on attempting to move that part of the spine, and often some swelling and ecchymosis; neither irregularity nor mobility of the spines or transverse processes; no paralysis or hyperæsthesia of distant parts, unless there is also some lesion of the spinal medulla or nerves. It is, however, later on, when the first effects of the injury have been recovered from, and the pain continues, that the diagnosis becomes of most importance, and the surgeon has to determine whether there is a simple sprain of the muscles and ligaments of the spine or disease of the bodies of the vertebra, or chronic meningo-myelitis.

In any case where an action for damages is pending the examination must be made with the utmost care and circumspection, as the patient may under these circumstances be self-deceived, or malingering. The general appearance and behaviour of the patient should be carefully noticed, as well as his movements while his attention is diverted into some other channel.

In the absence of muscular spasms or paralysis,

hyperæsthesia, paræsthesia, or anæsthesia, at a distance from the injured part, and of increased or diminished reflexes, *meningo-myelitis* may be excluded. If the pain have continued for many months and there be no projection of a spine or spines (angular kyphosis), and if there be a certain amount of movement of the vertebræ one on another, while pressure down the spine from the head or the shoulders does not excite severe pain, *caries of the spine* may be excluded. It must be remembered that *caries of the spine* may be set up by a sprain. If, in the absence of these signs, there be a localised pain in the back, made worse by movement, with some tenderness along the spines, or the muscles by the side of them, and limitation of movement owing to pain, a *sprain of the spine* may be diagnosed.

If the muscles are found wasted, and if the spine can be bent painlessly to a moderate degree, while the effort to straighten it causes pain referred to the attachments of the erector spinæ, the injury is mainly confined to that muscle. If, on the other hand, the muscles be found fairly well nourished, and the pain in moving the spine be not in straightening it, but in bending it beyond a certain slight extent, it points to sprain of the vertebral ligaments. A muscular sprain is recognised by the pain caused by the contraction of the muscle; a ligamentous sprain is characterised by the pain on stretching the ligament; it must, however, be noted that pain is caused when a sprained muscle is stretched to the full. Occasionally, after severe sprains of the spine, especially of the neck, as in other joints, the part is left too movable, the ligaments being loose and lengthened. A severe wrench of the spine without fracture or dislocation may be followed by hæmorrhage around the cord, or by suppuration in the spinal canal, and suppurative meningitis.

4. **Wounds of the spine.**—Mere skin or flesh

wounds of this region do not present anything abnormal. If, however, a deep wound, such as a stab, be attended with a free flow of a clear watery fluid, it shows that the *theca vertebralis* is injured, and that the subarachnoid cavity is opened. For the chemical characters of this watery fluid, see page 83. Such an injury is likely to be followed by acute meningitis.

If a wound of the spine be immediately followed by paralysis of sensation or motion, it shows that the *spinal cord*, or one or more of the spinal nerves, is injured. The distribution of the paralysis will enable the observer to determine the nerve lesion; division of a nerve, causing paralysis of the parts supplied by that nerve without any effect upon the parts below; division of any part of the spinal cord paralysing all the parts below in those functions for which that particular section of the cord is a conductor. (See also page 99.) Wounds of the spinal cord are prone to excite myelitis.

## CHAPTER VII.

### THE DIAGNOSIS OF INJURIES OF THE FACE.

The greater number of the injuries of the face are too obvious in their nature to require notice here; but it may be pointed out that wounds must always be carefully examined for foreign bodies, that bruises must be examined for signs of fracture of the subjacent bone, and that the swelling following lacerations of tissue is often more marked in the face, particularly the lips and eyelids, than in other regions. When from a wound of the cheek there is a great flow of a watery fluid during mastication, the fluid being alkaline in reaction, and "amylolytic," or possessing the

power of converting starch into sugar, it indicates a wound of the *parotid gland* or of *Steno's duct*. And if, when the rest of the wound heals up, a sinus remains which continues to discharge saliva, it is called a *salivary fistula*. The alkaline reaction of the fluid, and its intermittent flow, which is always excited by mastication, are usually alone relied upon to decide the nature of the fluid; but if, on adding some of the fluid to a small quantity of a watery decoction of starch, and maintaining it at a temperature of about 100° Fahr. for an hour, it be found that the addition of a drop of tincture of iodine fails to give the characteristic deep blue reaction, and that a brown colour is produced, or no effect at all, the diagnosis is rendered certain. If the wound or the fistula be behind the middle of the masseter muscle, the saliva is escaping from the parotid gland; but if in front of that line Steno's duct is wounded.

If, in addition to an ordinary bruise of the face, such as a "black-eye," there be a distinct swelling, circumscribed, prominent, fluctuating, and dull on percussion, it is a *hematoma*. Such a swelling may become solid from coagulation of the blood, or may suppurate.

If, immediately after a blow upon the nose, a smooth, tense, rounded, glossy purple swelling be found blocking up one nasal fossa and fixed to the septum of the nose, it is a *hematoma of the nasal septum*.

If after a blow upon the face there be a puffy swelling, soft, crackling under the fingers, resonant on gentle percussion, it is due to *emphysema*, and indicates a fracture extending into one of the air-containing cavities of the face. The position of the earliest swelling will indicate whether the fracture is into the frontal sinus, the nose, or the antrum.

For the detection of *fractures* of the facial bones, each bone should be carefully examined to determine

whether there is any marked deformity. Thus, run the forefinger along the bridge of the nose to see if there be any sharp break in it; then, in the same manner, with the two forefingers examine the sides of the nasal bones and the nasal processes of the superior maxillæ; to deformity may be added mobility and crepitus, and in that case there can be no doubt in the diagnosis; the point or line of deformity and mobility will determine the position of the fracture. Then examine the upper row of teeth and the alveolar process, see if its line is unbroken, and if any part of it can be moved; with the eye and finger examine the hard palate to determine that it is regular and symmetrical, and that the two halves are not separated. Then throw back the patient's head, and gently everting the nostril, examine the septum nasi on each side; it may be found fractured and displaced vertically or laterally, with depression of the tip of the nose. But care must be taken not to mistake a natural deflection of the septum for a fracture in it; when the mucous membrane over the septum is unaltered in colour and not swelled, the curvature not tender, and there is no unwonted obstruction to the passage of air along the nose, it may be considered a natural deflection of the septum; but when, on the other hand, the curvature is abrupt, the part swelled, discoloured and tender, and there is unwonted obstruction to nasal respiration, along with flattening or deflection of the nose, it must be regarded as a fracture. Then compare the two malar bones and note any irregularity, flattening, or mobility of the one struck; and from these pass the fingers back along the zygomatic arches to determine whether either is broken across, which will be indicated by irregularity of the bone and mobility of the fragment. In some cases the fracture of the bones of the face is so extensive that the fragments can be seen and felt to move with the utmost ease; in other



cases again there is so much swelling and bruising of the soft parts that a thorough examination and diagnosis cannot be made until after the lapse of a few days.

The lower jaw must be examined in a similar manner. The surgeon should first run his fingers along the outer and under-surface of the body of the bone to detect any irregularity or want of symmetry of the two sides. Then let him look at the line of the teeth, and if any irregularity in it be seen, let him grasp the bone, with one hand on each side of the deformity, and try whether there be mobility and crepitus, and note whether the fracture extend through the alveolar process alone or through the body of the bone as well. If the fracture be opposite or behind the canine tooth, the sensibility of the lower lip on the same side should be tested, to ascertain whether there is also injury of the inferior dental nerve. The surgeon should carefully note whether all the teeth are in place, and if not, he should make sure that one has not slipped down between the fragments. The ramus of the bone must then be carefully examined; by seizing the angle mobility can be tried for, the contour of the posterior border as well as of the surface through the masseter muscle should be determined. Should these parts be sound and yet the patient complain of great pain in opening and closing the mouth, while he can himself feel and hear crepitus, the coronoid and articular processes should be carefully examined. Place the fore-fingers, one immediately in front of each pinna, to feel the condyles in their normal position, and carefully compare them to make certain whether they are or are not symmetrical, and look closely at the position of the chin, noting whether the space between the lower central incisor teeth is vertically below that between the upper; should there be deformity of one condyle, while the chin is displaced to the same side, a fracture

of the neck of the jaw on that side is to be diagnosed. The coronoid process is to be explored by the finger in the mouth, which may detect that it is immovable, or that it is movable on the rest of the bone, and sometimes a sharp projecting edge or point of the fracture can be detected.

If, however, on placing the finger immediately in front of the tragus, the firm, slightly projecting condyle of the lower jaw is not to be detected, but, on the contrary, a hollow (the glenoid fossa) is felt, while there is a fulness of the temporal fossa just above the zygoma, there is a *dislocation of the jaw*. This may be *unilateral*, in which case the chin is displaced to the opposite side, or *bilateral*, when the mouth is open and the chin protruded, and there will be the usual signs of pain, with dribbling of saliva, and pain in speaking or attempting to swallow.

## CHAPTER VIII.

### THE DIAGNOSIS OF INJURIES OF THE NECK.

THE injuries of this region may be divided into wounds, contusions, the impaction of foreign bodies in the respiratory or alimentary passages, and the local effects of heat and caustics. Sprains and fracture and dislocation of the cervical spine have been considered under the head of *injuries of the spine* (chapter vi.).

**Wounds of the neck**, inflicted from the outside, are, of course, obvious, but they vary from the most trivial, through all grades up to those which are almost instantly fatal, and it is necessary both for purposes of prognosis and treatment, to determine what parts have been severed. The question of primary interest is that of wounds of