

The Surgery of the Nerves: lecture

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Delivered for Diseases of the
Nervous System, Welbeck Street, London,

8th September 1899.

BY

JAMES CANTLIE, F.R.C.S.,

Surgeon to the Hospital.

(Specially reported for "THE CLINICAL JOURNAL")

To be returned to : -

THE EDITOR,

35A, Welbeck Street,

Cavendish Square, LONDON, W.

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A CLINICAL LECTURE ON
"THE SURGERY OF THE NERVES"

Delivered at the West End Hospital for Diseases of the
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A CLINICAL LECTURE ON
"Practical points connected with injuries to nerves"
~~"THE SURGERY OF THE NERVES"~~ *Nerve Lesions*

Delivered at the West End Hospital for Diseases of the
Nervous System, Welbeck Street, London,

8th September 1899.

BY

JAMES CANTLIE, F.R.C.S.,

Surgeon to the Hospital.

GENTLEMEN :

The subject for our consideration to-day is *"The Practical points connected with injuries to nerves Lesions"*
~~"Surgery of the Nerves."~~ *It is* That is a large subject, and at
the same time, ~~it is~~ *unless specially considered in a devoted Nervous work* not a very attractive one, ~~so I thought~~
so I will content myself with limiting my
~~I would tell you something about the surgical injuries to~~
remarks ~~made~~ in regard to the number of nerves,
~~nerves and the effects of such injuries upon them. There~~
dealt with, nor will there
~~will not~~ be time for me to dwell long on any particular
point, ~~so I shall go as quickly as possible over some of the~~
~~most important points of attention required from the surgeon~~
~~in such cases of injury.~~

The Cranial Nerves.

~~First of all let us look at~~ The olfactory nerve.

~~This~~ becomes of interest to the surgeon inasmuch as the
on which the olfactory ^{lobe lies,} through which the nerve passes
cribriform plate of the ethmoid bone ~~and~~ *on this way ^{the nose is}* sometimes
(the lobe with) of the nerve
fractured, and some filaments, ~~but not the whole nerve,~~
are torn.

Before proceeding further I will show you a case of a girl which is waiting for a diagnosis to be made. I have not examined the case yet, but it is said to be one of some deformity about the right shoulder, which deformity is said to have been present from birth, possibly it is a congenital dislocation. The clavicle is laid down so early, and the epiphysis is so insignificant, that even supposing the epiphysis were not developed, there is a small shell there. Even arrest of development of the epiphysis would not make any difference. Therefore it is something on the external aspect of the shoulder joint. The shoulder is stiff but the scapula moves. If I hold the scapula she cannot move that arm upwards. That failure may be due to ankylosis at the shoulder joint, or it may come from paralysis of the serratus magnus. If the serratus

magnus is paralysed you will have at least some movement, as there is here, and that will not explain the deformity. When the serratus magnus is paralysed the arm can be got up, but not above the shoulder level. Here there is evidently a dislocation upwards, the condyle of the humerus is quite near to the clavicle. A dislocation upwards is about the rarest condition you can meet with. It occurs almost solely in old people in chronic rheumatic arthritis. In chronic rheumatic arthritis new bone is thrown up and interferes with the biceps tendon, which becomes absorbed, and when the biceps has gone it permits the head of the bone to slip. The capsule of the shoulder joint is not sufficient to prevent dislocation, the only thing it depends upon to prevent dislocation is the biceps. She has got some power in the biceps. There is no flattening behind, and the vertical axis is all right. Therefore my diagnosis is that she has paralysis of the long head of the biceps and the head of the bone is dislocated upwards, it is resting on the upper instead of the lower part of the glenoid fossa and partly ankylosed, but

not completely so. There is absolutely nothing to be done for that, particularly as it has been present six years. Of course as she moves it she may get freer movement than she possesses at present, but the extent of such movement will never be very great.

~~Well, to resume, let us look at the olfactory nerve.~~ You can imagine that a fracture through the base of the skull is not likely to destroy the whole nerve, but only a few filaments, and they are not of much consequence. One does not hear of loss of smell resulting from a fracture through the cribriform plate. Loss of the sense of smell comes from paralysis of the facial nerve. *(one) will* *(the facial nerve)* ~~you~~ may ask "what has ~~it~~ to do with the *sense of* smell?" It is necessary ^{to} ~~to~~ the dilatation of the nostril. When you smell you dilate the nostrils, and you sniff up air from a widened nostril. If the facial nerve is paralysed the nostril will not dilate and consequently smelling will not be performed by the upper part of the nose. Now, in the nose we get the first and second divisions of the fifth nerve supplying the entrance, or guarding the entrance. The same

nerves supply the teeth, and the second division sends filaments into the nose. The anterior dental supplies the two sides of the *maxilla* and they send branches into the lower part of the nose. Therefore the first division of the fifth supplies the eyeball, and a bright light upon the eye will cause sneezing. Disease of the teeth will cause picking of the nose. Children who are found often picking their nose do so either because they are teething or because they have caries. Such a child will pick its nose till it bleeds. All sorts of applications are put on the nose to relieve it, but the origin of the mischief almost always lies in the teeth. Therefore put the teeth right, whether in the front or at the back of the mouth, especially in the upper jaw, and you will find it will often check the irritation in the nose. You may say that picking the nose is a habit, but a habit never comes unless there is some visible cause for it. There may be disease of the eyeball or a defect of lacrymation, or the stoppage of a nasal duct as a cause of sneezing and picking of the nose.

With regard to the second or optic nerve, there are a number of things which one could point out of surgical interest in connection with it. But the optic nerve does not often come into the way of danger from wounds. Still, the optic nerve may be torn by a fracture at the base of the skull, and of course it may be involved in an aneurysm or new growth. There are cases on record in which the second nerve has even been injured by a stab. One case was recorded in which a stab penetrated through the upper eyelid, went above the eyeball and cut the optic nerve at the back without injuring the eyeball in the least. Therefore even the optic nerve does not seem to be safe from a surgical point of view.

The next set of nerves is the third, fourth and fifth, and these being so close together may all be involved in one common tumour. If you make a drawing of a vertical section through the skull at the sphenoid bone shewing the cavernous sinus, you will find the third, fourth, fifth and sixth nerves all run in connection with it. Of all these, the sixth nerve is the

most likely to be injured, and the reason for that is that it lies against the bone. It is but seldom that the others which I have mentioned are injured. A man with a fractured base of the skull may have an internal squint in one eye. Why is the sixth nerve involved in this? Because it comes into relation with the base of the skull, it lies so close to the vein of the cavernous sinus that it is not infrequently involved in surgical trouble. If an aneurysm involves these nerves which I have referred to, all movements and sensation in the eyeball will be completely lost.

The third nerve is that which the surgeon has most to do with in connection with syphilis. It is in the third nerve that one most frequently gets gumma, and it is also the earliest nerve in which that lesion appears. That is to say, in the very commencement of the third stage of syphilis, the first thing which heralds the third stage is that the subject is perfectly well one day but the next morning he wakes up and finds something the matter with his eye, which is due to paralysis of the third nerve. This comes quite suddenly and you

have to increase your dose of antisyphilitic medicine or change the form in which you have been administering it, otherwise you will not be able to prevent the formation of the gumma.

Next with regard to the fourth nerve. I recently saw a nasty thing happen to the fourth nerve. A lady had some irritation about her eyelid, and the examiner wanted to dilate the pupil, and proceeded to bring it about by the usual method, namely by atropine. The third, fifth and the sixth days came but the pupil did not recover properly, and after it did resume its normal size she had paralysis of the fourth nerve and has had it for eighteen months, and I am afraid it seems as if she is not going to get over it. Paralysis of the fourth nerve is a peculiar condition, and it is not very common. The usual way to recognise it, and that which the text-books tell us, is that the patient cannot come downstairs without stumbling. This patient could not rotate her eyeball to look at the step next below her. Such patients have to look intently at their feet in descending stairs. Paralysis of the fourth nerve is

very difficult to diagnose, and the symptom I have mentioned is often the only one which you can get, still it is a very definite one.

The fifth nerve is that which guards the entrance to all our senses, to the optic sense, to the nose, to the ear and to the mouth. Indeed it is distributed all over the face. These divisions of the fifth nerve are very important from a practical point of view. A person complains of neuralgia and you want to find out where these nerves are. The first division of the fifth comes upon the face at the notch in the anterior part of the eyeball, at the junction of the inner third of the arch of the orbit. That passes upwards, sending branches as far as the lambdoid suture, so that the whole of that part of the scalp and the front of the forehead is supplied by the first division of the fifth. It is very important to know the position of these nerves because you may want to do a neurectomy, that is to say to cut out a piece of one of these nerves to cure the neuralgia. Of course such surgical interference with neuralgia is not carried out unless one is driven into a

corner. A very common cause of neuralgia in the first division of the fifth nerve is malaria. You may say malaria does not concern people in this country, but it does. You may find that the only remnant we have here of malaria is this affection of the first division of the fifth. I have no doubt neurectomy has been performed in such cases when a dose of quinine would have cured it. This kind of neuralgia is generally confined to one eye, but it sticks to it. Another peculiar form of malarial affection of the first division is a baldness on the head in spots. A relative of my own was suffering from patches of baldness on the head. Everything imaginable had been applied for its relief. At last she took a dose of quinine and persevered with it, and not only did the neuralgia disappear but her hair came back properly in all the parts where the head was bald before.

When you have got the spot at which this nerve emerges, you have no difficulty in getting hold of the others. If I draw a vertical line from the notch

which I spoke of down between the two bicuspid, you have the exact line along which the nerves emerge. The point at which the third division emerges varies between a child and an adult. In a child, before the teeth have appeared, the foramen is close to the upper margin of the jaw, but after the teeth have come it is exactly half way between the bony and the lower borders in that vertical line. When the teeth have gone and the person is aged, the nerve comes close to the upper border again. It is not that the distance of the nerve changes, but the quantity of alveolus changes. If you want to define it you have only to open the mouth in that line, and just immediately below the mucous membrane you find the nerve. Sometimes that nerve has to be excised for neuralgia. Sometimes you can get hold of it and pull it out and stretch it, and sometimes you get it by trephining, which is bad. The best plan is to reach it from the mouth. The inferior dental nerve can be excised all the way along. For persistent neuralgia you can cut through that nerve as it emerges. If that is not sufficient you can excise the whole second

division, or you can go back as far as Meckel's ganglion and excise that. The chief thing I want you to remember is where exactly to find it.

We spoke of reflex irritation of the nose proceeding from the teeth, and the same may be said about the ear. If you examine the ear the patient coughs. That is because you irritate Arnold's nerve which is connected with the pneumogastric controlling the stomach and the patient coughs. You may get ear sneezing, and a plug of wax inside the ear will sometimes keep up a cough for a long time. Coughs extending to eighteen months or two years have been recorded when the cause has been some wax in the ear. Then there is what I call a "child's cough." A child will cough in the morning and you will think there is something the matter with its lungs, but on listening you may hear nothing to give you such an impression, there are no bronchial rales or anything of that sort. But you may depend there is some irritation somewhere to account for that cough. The child may have bad teeth, and you may find it picking its nose, and if it has got picking of the

nose it may also often have earache. This three-fold irritation is due to the branches of the fifth nerve. When the ear has been mopped out the child will not cough. I think a good name for that is a child's cough.

Next we will speak about the facial nerve. There is not practically much about the facial nerve except that it is sometimes necessary to be able to diagnose the situation of its injury in a case of fracture of the base of the skull. We will imagine a piece of the temporal bone, the seventh or facial nerve goes in through the bone and then suddenly turns down and emerges. Before it goes in it lies close alongside the auditory nerve, and before it emerges it gives off the chorda tympanic nerve. Any injury therefore to the facial nerve before it reaches this portion of the temporal bone will involve hearing. If you have a fracture or tumour growing or you have had some effusion of blood somewhere in the base of the skull before the facial nerve has got into the petrous portion of the temporal bone there will be deafness. Therefore you

can know where that accident was. If there is fracture through the substance of the petrous bone there is paralysis of the chorda tympani in addition to the facial nerve. It is important, in law cases especially to know where the injury is, and there are one or two distinct rules in connection with it, namely : an injury to the nerve before it reaches the bone involves the auditory nerve. A fracture through the middle portion of the petrous bone will not produce deafness on the other side, but the chorda tympani will be paralysed. If a fracture involves the nerve and the bone beyond the spot where the chorda tympani is given off you get facial paralysis without the chorda tympani being involved, without deafness, and that will help you in your diagnosis. The facial nerve is sometimes stretched, though it is a hopeless operation. Lately one of the physicians here sent me a girl with facial paralysis, her features being all dragged into the opposite side. For cosmetic reasons she wanted to get this disfigurement rectified. But what can you do ? This paralysis had been in existence for many years,

and therefore there was not the least doubt that it was no good cutting down on the nerve and tying the ends together. The next idea was to cut out a piece of nerve. In the first place that would have left a large scar, which would not have added to her beauty, and in a very short time the face would relax and the parts fall back again. Another man suggested that the facial nerve should be cut on the other side. I suppose you know what would be the consequence of that. The facial nerve is necessary to keep the buccinator muscles against the teeth, and if both facial nerves were cut the patient could not eat. So I left the case alone because I did not know what to do. Electricity had been tried but would not produce any result, and surgery was powerless to relieve the condition.

The great occipital nerve

~~We will now leave the cranial nerves, and proceed to those of the neck.~~ A rather distressing ^{lesion} ~~accident~~ is apt to occur. The posterior primary branch ~~is injured~~ to the occipital nerve. The way in which that takes place is by a person falling asleep in a chair, allowing his head to come back over the edge of the chair. When the person wakes up that part feels numb,

and though the patient thinks it will go off, it does not. If the sleep in that position has lasted for two hours, the numbness will be there from six to twelve months. There is nothing to be done for it. The nerve has been bruised and some effusion has taken place into it, and it will be a long time before the nerve will come round again to its normal condition. It is important to remember that this paralysis may occur in such a way, because it is likely you will meet with such cases.

Now, on the side of the neck we have a few nerves which are of some little consequence. One of the most important is the spinal axillary, an inch below the mastoid process is the spot where the spinal axillary enters. Sometimes it is necessary to cut down upon the spinal axillary nerve. It has a winding oblique course, and it is necessary sometimes to diagnose its position. There are a number of other nerves in the neck, and it is very necessary to find the bunch of nerves known as the brachial plexus. You can feel them quite well in thin people and children, and I can

make them out distinctly in the boy before you. In fat people with high shoulders they cannot be felt or very seldom. The brachial plexus is sometimes cut down upon for the purpose of nerve stretching. Practically you can make the same incision as you would for the subclavian artery, for behind this artery you will find the plexus. The brachial plexus may be torn from the spinal cord by machinery or by forcible surgery. A nerve does not easily tear in its course, the tenderest point of a nerve is where it just loses its sheath before passing into the spinal cord, here it is very weak and it is here that the injury generally results.

A stab through the shoulder joint would bring you upon the median nerve before any others. The most anterior nerve is the median, and that alone may be injured, resulting in paralysis of the parts supplied by it.

The next nerve you would come upon which has surgical importance is the circumflex nerve, which is pretty firmly involved in paralysis. Curiously enough, it is not the one which is very frequently involved by

the use of the crutch. The nerve which the crutch affects is the musculo spiral, and that is because it is not very often the crutch is put into the top of the axilla, but further down. The circumflex is frequently involved in various diseases, and dislocation of the shoulder, new growths in the upper end of the humerus. A fracture in the anatomical neck or in the surgical neck or in the upper part of the humerus will cause paralysis of this nerve and the parts supplied by it. Such a paralysis may ensue from a fall upon the hand or upon the elbow, for the capsule of the shoulder joint is very loose and the nerve may become stretched in consequence. Crutch paralysis is due to pressure on the musculo spiral nerve, which comes from the inner side, at the insertion of the deltoid muscle, close to the bone. Any disease of the bone, a kick upon the arm or a bite from a horse, a gunshot wound or a fracture of the humerus results in callus being thrown out, and it is almost impossible to keep that part of the arm quiet by a splint, and the callus which forms there is almost sure to involve the musculo spiral nerve. If you cut

away the callus you may injure the median nerve. If the paralysis of the musculo spiral is intense the patient has wrist-drop.

A very common form of paralysis used to be that produced at the bend of the elbow from bleeding. In cutting down upon the basilic you find a nerve comes in the way. That is the internal cutaneous nerve. A cicatrix forms there and then you get a form of scar paralysis, a very painful scar after blood-letting. But in the bend of the arm you get another form. Not only do you get a painful scar and a painful arm but you get a bent arm. The scar may give rise to a reflex irritation through the muscles which it supplies and cause "bent arm."

The ulnar nerve is very frequently paralysed on account of it being exposed behind the internal condyle, but there is a form of facial paralysis of the median nerve which comes from violent muscular exercise, chiefly in the form of twisting the arm, and particularly in spasmodic movements of that character. By this means the nerve gets between the heads of the bones

and gets damaged.

With regard to paralysis in the fingers, one important point is that we say the ulnar nerve supplies the one and a half fingers in the front and one and a half fingers at the back of the hand. But that is not true. The ulnar nerve comes in further than the first and second joint, and the radial comes in further than the knuckles.

I will now pass to the nerves of the lower extremity. Of course you know all about hip-joint disease and reflex irritation in the knee produced by such disease, that is to say you know how it is you get pain in the knee in hip-joint disease. A child comes in complaining of pain in the knee-joint. The mother states she has poulticed the knee-joint, that somebody has put on a splint there, that it has been blistered and leeches applied. Often it has not been recognised that the hip-joint is the seat of the trouble. The means of diagnosis are simple enough, all we have to be concerned with now is the explanation. The same nerves which supply the hip-joint supply the knee also,

and the pain in a nerve is referred to the furthest point. We have got three nerves passing down over the hip-joint, and going to the knee. The anterior one goes from the front of the hip to the knee, that is the anterior crural. We hear a great deal about the obturator nerve as being the means of communication between the hip and the knee, but the means of communication is just as often as not the anterior crural nerve. The obturator nerve supplies the inner part of the thigh and enters the back of the knee. Pain at the back of the knee joint from the hip will show that the obturator nerve is the carrier of the impulse of pain.

Then there is the sciatic nerve, which comes at the back of the knee-joint and splits into two popliteals and supplies the sides and back of the knee, and is responsible for the pain felt at the back of the knee. Everyone knows about the hip-joint, but it is wonderful how you may be caught, especially by some girl coming to you for an opinion. You may just have diagnosed a case in which the pain at the knee was due to hip-joint disease and sent the patient away, but when another

comes in you may fall into a trap, for nothing is more common than an hysterical pain at the knee-joint. I have seen the lower third of the thigh amputated for hysterical pain in the knee-joint, when there was not a single thing the matter with the knee-joint. This hysterical pain in the knee-joint will delude the very sagest man. Not only may this particular hysterical patient have a pain in the joint but an effusion also, no rise in temperature, no heat in the joint. In the patient who had her leg off for such a pain there was no synovitis, no inflammation, and nothing there except a passive hysterical effusion into the joint. It is said that it comes from the uterus, and if you believe the uterus is the centre of everything hysterical, all right. An explanation is offered in this way. There is the hypogastric plexus of nerves, which supply the uterus, and this gives off branches to the anterior crural, which comes from the fifth, fourth, third, second and first lumbar, and the hypogastric also supplies the uterus. Thus we find the possibility of the knee-joint irritation having travelled from the

uterus. Again, the sciatic is supposed to be the cause of something of the sort.

Some people say the uterus is nothing to do with reflex or hysterical conditions. That it is all nonsense, because if you excise the uterus or the ovaries it will make no difference to hysterical symptoms. There are some who say that the hysterical conditions are due to the uterus because they are practically always manifest in the female, and inasmuch as the only organs the female has which males have not are the uterus and ovaries, therefore the uterus and ovaries must be the seat of the trouble. The argument which now seems common is that the female organs generally have nothing to do with hysteria. I believe they have, though.

Now you may get a definite pain in the leg. Now, pain in the leg is by some regarded as as definite a disease as small-pox, pain in the leg running along the course of the perineal nerve. This pain has been described by a number of men, but when the patient was examined they could make nothing of it. But one or two post-mortems have shown that it has had some pelvic origin, that there was a large pelvic tumour which involved the sciatic nerve, and thus giving rise to the pain in the leg. Another cause of this pain is said to be cancer in the rectum, because one is often associated with the other. On the other hand a full rectum will give rise to sciatica, and sometimes a plexiform condition of the veins giving rise to it and to pains in the head also. Therefore before coming to a conclusion about these pains one needs to consider twice before committing oneself. For instance renal calculus will give rise to some peculiar symptoms in the leg. I have passed renal calculi from the left kidney and at the same time I was very much bothered by an effusion into the sheath of the tendo achillis, as well as a trickling

in the axilla. I thought it was absurd to consider that there was any connection between the two, and tried to make myself believe that I had strained my tendo achillis and got some local irritation resulting from it. I happened to tell a medical friend about it who was deeper read in professional literature than I was, and he referred me to some observations by Paget. I procured the book and found the same symptoms spoken of. I had felt them before I had spoken to anybody of them and before I knew there were any observations on the subject. I was never so astonished at the clinical acumen of Paget as when I read his observations in this connection.

The only part which I have left untouched so far is the abdomen, and that I must hurry over, as our time is up. The abdomen is supplied with nerves from the seventh, the lower sixth, and first and second lumbar. Along the seventh rib comes the seventh intercostal nerve, which comes to the surface of the skin over the stomach. If you have any neuralgia or irritation of the eighth nerve what is the symptom? There is a

tremendous pain in the pit of the stomach, and often plasters are constantly applied to that part, whereas it is nerve which is at fault. If there is any disease of the organs below the skin of the stomach, the skin is not only sensitive but the muscles below are immediately called into action to protect the tender part below. That is the only means we have for protecting our viscera within. A blow on the muscles of the abdomen, if there is warning that the blow is coming, will not do much injury, whereas the same force might break a rib, and moreover if there were ribs over the stomach and they were broken they might and probably would penetrate important viscera, as indeed the ribs sometimes do. Even if you put cold upon the abdomen the muscles there will immediately tighten, therefore it is a reflex act, and the stimulus comes from the lower sixth dorsal ganglia, from the splanchnic nerves.

If there be any disease of the spine, or a Pott's curvature, the pain will be referred round the body, it may feel as if there is a tight cord, and it may interfere with digestion. The lumbar ganglion has to do

with the front of the thigh and the viscera of the
pelvis, but not with the abdominal viscera themselves.
Any irritation of the splanchnic nerves will irritate
the wall of the abdomen and the lower part of the chest.

Inventory of the Boxes