Clinical Observations
on Some of the More Important Injuries
and Diseases of the Vertebral Column.
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And Diseases of the Vertebral Column.

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List of Contents

Introduction

Injuries of the Vertebra

Concussion and Compression

Cases

Fractures of the Vertebra

Cases

Dislocation of the Vertebra

Case

Diseases of the Vertebra

Acute Angular Curvature

Cases

Lateral Curvature

Ankylosis

Malignant Disease

Case

Umis bipida

Cases

Conclusion

Plates
Having during my attendance at the Hospital been much impressed with the importance of studying the more serious lessons to which the vertebrae are liable, both from injury and disease, and having been much struck with the little attention paid to them by the majority of my fellow-students, I have ventured to offer some remarks on them as the subject of the following thesis, not that I hope to advance anything new with regard to them, after the many valuable treatises written on this subject, but simply to give the result of my observations of some characteristic cases of this nature, most of which have come under my immediate notice, and to lay before you the inferences which I have been led to draw with regard to them. I have endeavoured to avoid recapitulation as much as possible, and for this purpose have chosen only the most marked cases, and have omitted many which were equally interesting, but were almost identical with those described.

I am much indebted to the valuable works of Pemberton, Chelius, Sir A. Cooper, Sir B. Brodie, Mr. Lyne, Mr. Miller, and Mr. Stafford. I may mention that, where I have found it necessary to quote from the works of these authors, the quotations are marked by inverted commas. For the rest, I am indebted to the principles inculcated and the practice pursued by my various teachers and to personal observation.
The photographs are done by Mr. Sunny, and my friends Mr. Watson.
The subject has been further illustrated by Photographic Drawings of each Cases and Preparations as I was able to obtain. I have to regret my inability to obtain a larger number, from having to leave Edinburgh sooner than I had anticipated — I was first led to have recourse to this useful auxiliary (Which I hope soon to see more generally employed for portraying the effects of Surgical Injuries and Natural deprivations) by my having failed to obtain an accurate Drawing of a Case of Spina Bifida.

In entering on the Consideration of the subject of this Paper, I have thought proper to treat first of Injuries, then of Diseases of the Vertebral Column. Each of these departments I have preceded by a general description of the symptoms attendant on the various forms of Injury and Disease of which they are composed. Subsequently, a special description is given, illustrated by cases, and followed by Observations and Remarks.

General description of the symptoms of Injuries of the Vertebræ.

Among the more immediate consequences of these Injuries may be mentioned; Collapse, more or less intense, sudden loss or impairment of sensation, or voluntary motion, or of both; Pain at the injured part, aggravated by motion, paralysis of bladder and rectum and priapism,
The more remote consequences are, obstinate constipation, insatiable thirst, dry, foul tongue, increased heat of surface, with dryness and harshness of the skin, palsy and frequent pulse, and general debility, atrophy of the paralytic limbs, thrombosis on the sacrum, heels, and other parts most subjected to pressure, incontinence of urine, with copious deposition of phosphates and curdles; desiccation of the prepuce and orifice of the urethra, spasmodic twitchings of the limbs, and, in cases which terminate fatally, alteration of the voice, loss of appetite, great emaciation and prostration of strength, repeated febrile paroxysms attended by severe rigors and profuse perspiration, with increasing difficulty of respiration, generally preceding the fatal event.

There are certain peculiarities in the symptoms which follow injuries of the various portions of the vertebral column which serve to indicate the precise seat and nature of this lesion. These I now proceed to enumerate in detail.

Immediate death is in most instances the result of severe injury of the first three vertebrae. I have however seen two cases described by Sir Astley Cooper, in the one, there was fracture of the first cervical vertebra, and the patient lived for a year; in the other the second was fractured, death took place at the end of forty seven weeks, and was attributed to general drooping. Bony union of the atlas and axis was found to have taken place.
It has been observed in cases where death has taken place by hanging, and where dislocation of the second vertebra is of frequent occurrence, that emission of cervical fluid often takes place. When these injuries are met with in the lower cervical vertebra, life is generally prolonged to a greater extent, to periods varying from a few days to several weeks. Respiration from the first is laboured and abdominal, on account of paralysis of the intercostal muscles, the diaphragm remaining unaffected, because the origin of the phrenic nerve is above the seat of injury. Delirium is occasionally present. The paralysis in general involves the upper extremities more or less, and paresis is a frequent symptom. Death usually occurs at no distant period, being occasioned by incapacity of the diaphragm alone, perfectly to carry on the function of respiration, and asphyxia is induced, by the gradual accumulation of mucous secretion in the bronchial tubes. In other cases, it is occasioned by the superelevation of inflammation of the cord and its membranes.

In severe injuries of the dorsal vertebra, the abdomen becomes much inflated, the bladder and rectum are generally paralyzed, whereas in those of the lumbar region this is not invariable.
The following are the various forms of injury to which the spinal column is subject:


The first of these may be divided into three classes, according to its results. 1st. **Simple Concussion**. 2nd. **Concussion with local congestion and extravasation of a small clot of blood**, constituting one of the forms of Compression, and 3rd. **Concussion followed after a short time, by subacute inflammation of the cord and its membranes, giving rise to the deposition of organized lymph, and constituting another form of compression**: this either terminates (under suitable treatment) in resolution, or proceeds to inflammatory softening and disintegration of the cord.

Concussion is produced either by direct violence, or by falls upon the head or sacrum from a height. The symptoms attending it are, transient loss of consciousness and voluntary motion, increased frequency and feebleness of the pulse, paleness of the face, and anxious expression. Concussion with extravasation is the result of direct violence, and presents symptoms similar to those induced in simple concussion, except as regards the greater permanence of the paralysis. The third form, viz., Concussion, followed by subacute inflammation of the cord and its membranes, may supervene after either of these just mentioned. It is insidious in its approach, not occurring or at least giving any evidence of its presence, till some few days after the injury, and that
often in cases where danger is least suspected - It is marked by slowly but gradually increasing paralysis.

Compression of the cord is also produced by fracture of one or more vertebrae with displacement, and by dislocation.

When there is fracture of the spinous process of one or more vertebrae, the usual modes of detection of fractures in other parts of the body are available, such as crepitation, displacement of the fragments &c. - When fracture occurs in the bodies or transverse processes, the diagnosis can only be inferred from the symptoms induced, and from the history of the injury - It may occur with or without displacement.

In dislocation, the symptoms are nearly identical with those of fracture, except that deformity is always present.

I will now enumerate a few cases of these various forms of injury.

Wm. Cleghorn, at 20 - Carter, was admitted into the Royal Infirmary under Dr. Mackenzie's care on the 10th of March 1832.

It was ascertained that, an hour before admission, when driving a cart through a low archway, his back came in contact with the building, and he fell into the cart - Loss of consciousness was the immediate consequence, and after lying a short time, on endeavouring to rise, he found that he had lost the power of voluntary motion - On examination, marks of severe contusion were observed
in the lower dorsal region, and great pain was complained of.
The immediate effects of the injury had not passed off, the
surface and extremities was cold, and the pulse frequent
dand left. Mental confusion and anxiety were also
1resent - after the lapse of a few hours, the usual treat-
ment having been adopted, it was found that the patient
had retention of urine, requiring the use of the catheter.
During the two following days, the paralysis of the lower
1remities continued, but this gradually wore off, and
he was dismissed cured after a residence of twenty days.
This patient, on admission, evidently laboured
under the collapse which usually follows a severe
injury, and the continuance of the paralysis, there
no doubt, was owing to local congestion of the cord,
or its membranes, at the seat of injury.

Case II. The subject of the following case was admitted into
Wynns wards in March 1832. About a month before ad-
mision, he fell backwards down stairs, and sustained a
severe blow on the lower part of the neck, he became insens-
ible, and on recovering consciousness, he complained of severe
pain in the back of the neck, and could not move readily on
account of pain and stiffness. For a few days he was able
to walk with difficulty, subsequently the power of motion be-
came impaired, first in the lower extremities, then in the
upper; sensation remaining unimpaired.
On admission, the patient could walk with difficulty, with
the assistance of another person. He could not close his hands, or grasp anything firmly. For some time after admission no improvement took place, on the contrary, motion became more impaired — sensation remained normal.

The treatment adopted, although not productive of immediate benefit, was found after the lapse of two months, to have improved the patient's condition so much, as to enable him to turn in bed without assistance, and to grasp firmly anything placed in his hand, and convey it to his head. He was still unable to walk without assistance. In consequence of circumstances having necessitated his dismissal from the Hospital in the beginning of August, I have unfortunately been unable to ascertain the further progress of this case, but from the manifest and progressive improvement that had taken place, there is every reason to believe that a perfect cure would be the result.

In cases of Concussion associated with, or followed by local congestion, a more permanent degree of impairment of the functions of the spinal nervous system exists — This may appear immediately after the receipt of the injury, or may be delayed till reaction takes place — and then go on progressively, increasing. In the former of these two conditions, the cause of the paralysis is believed to be, extravasation of
a clot of blood, which presses on the cord, and excites a certain degree of active congestion; in the latter (as in Case II) the immediate effects of the injury are less serious; but from the intervention of a more degree of inflammation of the cord and its membranes, of which the result is, the deposition of lymph, or other changes in these structures, paralysis is more slowly induced and more permanent in its nature.

In cases of fatal concussion, the spinal cord has been occasionally found bathed in extravasated blood — in other cases, it has been found in a semisolid condition, the result of inflammatory softening, and in other cases no appreciable change could be detected.

The prognosis, in cases of concussion with or without the formation of a clot, ought to be guarded, but, as a general rule, is favorable, and it is probable that the recovery of the patient will not be long delayed. These cases, however, must always be carefully watched, for although no bad effects appear at the time, they may supervene, when least expected. In the other form, the prognosis must be more guarded, as the issue of the case entirely depends on the amount of change that has taken place in the cord and its membranes, and the arrestment (under suitable treatment) or further progress of such changes.
Cases of simple Concussion will be found to yield, in general, to rest in the horizontal posture and antiphlogitic regimen; but should the shock of the injury prove excessive, the careful administration of stimulants and the application of external warmth, will be found beneficial. — In the second form the same line of treatment may be pursued; the accession of inflammatory symptoms must be carefully watched, and when occurring, endeavours must be made to arrest their progress, by local depletion, by means of leeches or cupping glasses. — When the intensity of the symptoms has been subdued by these means, counterirritation, by means of blisters, or the actual cautery near the seat of injury, will be found of much service.

In the more protracted paralyses resulting from such injuries, Galvanism has been highly spoken of, and in Case II, its employment seemed to be productive of benefit.

During my residence in the Infirmary, no case of fracture of the cervical vertebrae came under my notice, but as the case of Dislocation of the fifth cervical vertebra described at page 24, presented all the symptoms generally attendant on fracture in this region, I have not thought it necessary to transcribe a case, as longitudinally intended, from any of the works written on this subject.
With regard to fractures of the cervical vertebra Sir Astley Cooper says: “Death usually in these cases is from three to seven days in proportion as the fracture is of the fifth, sixth or seventh.” I am inclined to think, with all deference to such an authority, that the duration of life, after the receipt of such an injury cannot be so precisely estimated, as the result of each case must be regulated by the amount of injury done to the cord. Undoubtedly, in the majority of the cases, in which this accident has occurred, the observation is verified; but several cases are on record which form an exception. A very interesting case of fracture of the fourth cervical vertebra is mentioned by Dupuytren, where the patient was so far cured as to be able to walk a considerable distance, and where death took place thirty four days after a second fall.

Fractures of the dorsal vertebra rarely prove immediately fatal, but produce a train of symptoms very distressing to the patient, and from which recovery rarely takes place.

Alex. Smith, 44, was admitted, under Dr. Syme’s case, on the 13th of March, 1832, on account of a severe injury of the spine resulting from an accident which he had just sustained — in the lower dorsal region, an angular projection of the spinous processes existed, the examination
of which caused him much pain. There was complete paralysis of both motion and sensation in the lower extremities, but the muscular contractility of the bladder and rectum was unaffected. During the first fortnight, little change in the condition of the patient took place, beyond a slight increase in his control over the motion of the right leg - he having become able to move the toes of that foot. Progressive atrophy of the muscles of the legs took place. He was directed to endeavour to produce movements in the affected parts as much as possible, and after persevering for a short time, muscular contractile power was produced, although not of sufficient power to enable him to raise his limbs. After the lapse of six weeks, restoration of the power of motion of the other leg, to a slight extent, was noticed, and at the same time, an increase in the volume of the affected limbs became evident. The case continued steadily to progress favourably, and the patient slowly regained the power of motion, although he remained incapable of making forcible exertions.

At the time of his dismissal, on the 9th of July, the muscles had regained their normal size; he was able to walk with the assistance of two sticks, and to sit up without difficulty, unsupported. The projection of the pinion processes remained as on admission, but all pain and tenderness had ceased.

This case may possibly have been fracture
of the spinal processes only, with concussion followed by subacute inflammation of the cord; but I am inclined to think, from the progress of the case, that it was fracture with depression in the first instance, and that the parts became gradually accustomed to their unnatural position, because, after the first few days the improvement though very slow, was progressive — This case may be considered as fortunate in its result. No one need hope to be able after such a grave accident, to follow a laborious occupation, and if the use of the limbs is regained, and the general health remains good, it is all that can be reasonably expected: at all events, more or less deformity and debility must always exist.

The Prognosis, in cases of fracture in the dorsal region, is more favourable, than in fractures situated higher in the vertebral column. The duration of life, at least, is prolonged to a much greater extent, after the injury — Death rarely takes place before the end of two or even three months, and is often accelerated, or even occasioned by deep and extensive sloughs, which are apt to form on the sacrum, and projecting parts of the body.

Perfect restoration of the functions is a very rare occurrence, if it ever happens. Should the sloughing over the sacrum be averted, and the general health
remain good, well grounded hopes may be entertained, as far as regards the life of the patient.

The treatment consists in the maintenance of absolute rest; in the aversion of inflammatory complications; in attention to the due performance of the evacuations; and in the prevention of the formation of sloughs, by the use of the water-bed. When this cannot be readily procured, the water-pillow will be found of great service. The use of the catheter is necessary to prevent over-distension of the bladder in the first instance, and the retention in its cavity of fated ammoniacal urine, the secretion of which always accompanies such injuries. Hygienically the bladder with warm water may also be occasionally employed. In incontinence of some, which is one of the subsequent results of this injury, it is still necessary to employ the catheter, as by this means not only is the bed kept more dry, and the patient more comfortable, but the regaining of the tone of the bladder is favoured.

I think that any attempts to restore the displaced parts to their natural situation, by extension or otherwise, are not only highly dangerous, but would probably prove fruitless at the same time, as the amount of force required to do so, would not only injure the cord
still more, but might prove fatal at the time; and
even allowing that the attempt at seduction should
succeed, it is almost certain, that the parts would slip
back to their former position.

Attempts have also been made to remove the pressure
from the cord by trephining, but these have all proved
unsuccessful. This is not to be wondered at, as the
amount of injury done to the cord, at the time of the ac-
cident, is probably sufficient to cause death, independ-
ently of the maintenance of pressure upon it, by the
displaced portion of bone. It is, therefore evident
that such a procedure could only be beneficial, where
the pressure is occasioned by displacement of the
spurious processes alone, and where the cord has not
sustained such an amount of injury, as to preclude
the possibility of recovery.

Further reasons for non-interference are, the impossibility
of accurately estimating the amount of injury, as very
generally, the body of the fractured bone, or of that im-
mediately below it, also exercises pressure on the cord,
thus rendering operative interference useless.

There is another consideration, viz. the extreme difficulty
of the operation itself, from the fear of wounding still
further the spinal cord. The almost inevitable super-
vision of inflammation, which such an exposure of the
already injured cord, would be likely to induce,
Case of fracture of the lumbar vertebra. Case.

Patrick Thendaa, 25 years; labourer, was admitted into the Royal Infirmary on the 2nd of October 1830, under Dr Macconville's care.

On admission, he was in a state of collapse. It was ascertained that, while working at the Leith Docks, two hours previously, a large mass of rock fell upon his loins, forcing the trunk forwards upon his knees, and bending his body double; in this position he was found.

On examination, a tumour, consisting chiefly of extravasated blood, was seen in the lumbosacral and upper lumbar regions, where he complained of acute pain. Crepitations could be distinctly felt in this situation. Three of his ribs were fractured, apparently from the violence, with which the trunk had been forced forwards against his knees. A broad flannel roller was applied round his chest. His recovery from the state of collapse was gradual, when it was ascertained that he had lost the power of voluntary motion in his lower extremities, accompanied by almost complete loss of sensation. There was also paralysis of the bladder and rectum. A catheter was introduced, the urine was quite clear, and not at all tinged with blood. After a short time,
he complained of severe cramp, and involuntary twitching of the lower extremities. Sixteen days after the accident, incontinence of urine appeared.

Oct 28th slight increase in the power of retaining the urine.

General health improving. He was removed to a water bed, on account of small sloughs which were forming over the sacrum and both trochanters.

Nov 1st sloughs had separated. Involuntary evacuation of the urine and faces continue.

7th does cover with healthy granulations, and healing rapidly. Appetite good. Tongue moist and clean.

After lying for thirteen weeks on the water bed, he was able to retain his faces. He could also make his water, but could not retain it more than three or four hours. He had gained flesh considerably, but the muscles of the lower extremities were much atrophied. He was then able to sit up in bed.

After the regular use of the galvanic battery for some weeks, the legs increased in volume considerably.

Six weeks before dismissal, he was able to put on his clothes, and to move with the support of a chair and his bed to the side of the fire, where he sat for several hours every day. When sitting up, his urine occasionally dribbled away, but at other times he had complete power over his bladder.

When dismissed on the 21st of May, 1837, he was able
to walk with the assistance of a stick.
His hair had become grey, his body was much bent
forwards, and he had all the appearance of pre-
mature old age.

The nurse saw this man six months afterwards in
Leith - at that time, he was quite well, and was
in the daily habit of walking to the beach, to bathe
his feet and legs in the sea - a distance of half a
mile from where he lived.

This case I believe to have
been as successful in its result, as fractures of the
vertebra generally are - considering the way in
which the accident happened, it is curious that
the pelvis and its contents escaped injury, but the
spine was quite clear and of natural colour.

I am quite sure that the waterbed saved this
man's life, as, by its timely use, the extension of
the sloughing was prevented, and his prognosis im-
provement dated from the time he was removed to it.

It is needless to recapitulate the Prognosis and
Treatment, in fractures of the Lumbar Vertebra,
as they are almost identical with those occurring
in the dorsal region.
I omitted to mention, when enumerating the various kinds of injury to which the vertebral column is liable, that compound fracture is occasionally met with, as the result of gunshot wounds.

The annexed drawing (of a preparation in Mr. Macfarlane's Museum, which I had an opportunity of examining) illustrates a case of this description.

Peter, an Exciseman, at 35, while following his occupation received a gunshot wound of the abdomen, which he survived five hours, in great agony. The ball was found lodged in the body of the first lumbar vertebra.

In the Medico-Chirurgical Transactions Vol. XIII. page 418, a case is mentioned by Mr. Lawrence of ankylosis of the odontoid process of the atlas to the axis, as well as of the articular processes and bodies. In this case a leaden bullet was found lodged in the left transverse process of the atlas, firmly imbedded in a bony cyst, and causing prominence on the front of the oblong.

From the condition of these bones, it is evident that life must have been prolonged for a considerable period to admit of the formation of such an amount of osseous deposit. Many cases of similar accidents are recorded in the works of authors on military surgery. In almost all cases of this injury death has been the consequence, if not immediately, at least within a very short period. Case II. is a remarkable instance.
of injury which may be inflicted on the vertebral column (even in its most important part) consistently with the preservation of life.

Fracture of the Sacrum.

For the account of this rare accident I am indebted to my friend, Dr. Thomson, under whose care it occurred, while House Surgeon of the Perth Infirmary.

E. K. at 47, was admitted into the Infirmary on the morning of the 24th of January 1837.

He was brought to the Hospital by the Watchman at the Monkhill Tunnel of the D. C. Railway—who stated that, on examining the mouth of the Tunnel, previous to the arrival of an expected train, he had found the patient lying on his back, upon the line of rails. He was incoherent and had lost much blood. He was removed to the side of the line, and immediately after the arrival of the train, was conveyed to the Hospital.

The patient, being in a state of extreme intimation, was unable to give any account of the manner in which the accident happened; but his footsteps were seen in the soft earth, above the arch of the tunnel, so that it is probable that, having missed his way in the dark, he had fallen over the embankment, as the entrance of the Tunnel was at that time unprotected by any fence.
A wound, situated over the lower part of the sacrum, was found; this was sufficiently large to admit easily the little finger. On introducing the finger, it passed into a sac filled with coagula, and portions of the sacrum and coccyx, which were detached from their osseous connections, but not from the surrounding soft parts. On examination did not occasion the slightest perception of pain. Higher up, over the situations of the last dorsal and first lumbar vertebrae, much ecchymosis existed, and severe pain was complained of on examination or on the slightest movement of the body. No displacement of the spinous processes could be felt. There was a simple fracture of the left tibia and fibula, immediately above the ankle. The fractured limb was bent up in splints, and cold was applied to the wound over the sacrum. The bladder was evacuated by catheter.

On the following morning, the patient was found to be deprived of both voluntary motion and sensation in the lower extremities; much pain was complained of in the lower dorsal region. The abdomen was much distended, and a most distressing feeling of constriction existed. An enema administered for the purpose of relieving the bowels, could not be detained, on account of the paralysis of the sphincter. The temperature of the skin was slightly increased, the pulse was soft and regular. He had great thirst,
and was very restless, with disinclination for food.
No change took place in the patient's condition, till the 31st of January, except that large quantities
of purulent matter escaped from the wound.
The progress of the case was marked by increasing
weakness, absence of appetite, and profuse perspiration.
Next day the surface became cold, the respiration
laboured, the pulse weak and indistinct, and about
five p.m. death took place.
A post-mortem examination was not permitted.
This is to be regretted, as in no other way could the
extent of the injuries received, be ascertained.
There are several points of interest connected with
this case, First, the manner in which the accident hap-
pened; second, the true nature of the accident; and,
third, the escape from injury of the bladder, as
shown by the absence of blood in the urine.
It is not improbable also, that there was fractured
the last dorsal or fifth lumbar vertebra, but the
sacrum, having first come in contact with the bone
said, must have received the principal shock of
the injury.
Much has been written, and many disputes have arisen, as to whether dislocation of the vertebrae can ever occur without fracture of the articulating or other processes, and at first sight, one would be inclined to doubt the possibility of such an accident, from the admirable way in which the vertebrae are almost riveted to one another, but no one can deny that such a form of accident exists, after reading the cases which may be found in the writings of almost every authority on surgery. Every large Museum, which I have seen, contains one or two preparations illustrative of this accident.

Dislocation may be either partial, as when one of the articulating processes is displaced, or complete. The former is of more frequent occurrence. The most common seat of dislocation is between the first and second cervical vertebrae. The reason of this is obvious from their anatomical conformation. It may occur as the result of disease, as well as of injury. A remarkable case of this kind is mentioned by Mr. Lawrence (in the Medico-Chirurgical Transactions Vol. XIII. p. 406) The subject of this accident lived five years afterwards, and died ultimately from lumbar abscess, resulting from tears of the lumbar vertebra.

The other cervical vertebrae, from the greater extent of their motion on one another, are more liable to displacement than either the dorsal or lumbar. It is
produced generally by sudden and violent rotation of the head, or by severe blows on the neck. Dislocations of the vertebrae are almost always accompanied by fracture. Cases of nearly pure dislocation have occurred in the dorsal and lumbar regions, but are necessarily much more rare, from the larger size of the bodies, their more intimate connection, and more limited motion on one another.

Sir Charles Bell in his work on "Injuries of the Spine and Hip-bone" p. 25. Plate II. gives a case of dislocation of the last dorsal from the first lumbar vertebra, with entire division of the cord.

Robert Murdoch, 33, Brewer, was admitted under Dr. Macbeenie's care on the 6th of July 1832. States that three days ago he was thrown violently from a Brewer's cart, while in rapid motion. He alighted on his neck and shoulder, was stunned, but after a short time made several intellectual attempts to rise; he was carried home (a distance of two miles) suffering great pain. He had lost the power of voluntary motion in his lower extremities, and could not evacuate his bladder. A surgeon was sent for who passed a catheter, and ordered him to be kept almost in bed. On admission, the spinae pro-
cold of the eighth cervical vertebra was felt more prominent than that of the seventh, and immediately above there was a distinct depression, so that the spinous process of the fifth could not be felt. Slight pressure at this point caused intense pain, so violent as to make him cry out, and his head was suddenly jerked forwards. He also complained of pain in the left shoulder, where there were marks of bruises. There was complete paraplegia, with retention of urine, and paralysis of the extremities. The motions of the arms were much impaired, especially that of the left. The face was much flushed, and was expressive of much anxiety. The pulse was full and frequent; the skin dry and hard, with increased heat of surface; the tongue was foul and dry; the bladder was much distended. He was very restless, and complained of sleeplessness and inordinate thirst. Respiration entirely abdominal. A catheter was passed, and an enema administered.

No change of any consequence took place till the 13th, when incontinence of urine appeared. The urine bubbled away apparently as fast as secreted, for there never were more than two or three ounces in the bladder, when the catheter was introduced. The urine was loaded with thick,ropy mucus and pus, and was very offensive. A small slough was noticed on the abdominal. He was rather weaker, and had involuntary spasms and
twitching of the lower extremities. This was also produced
by pressure on the abdomen. There was a tendency
to recrudescence of the prepuce, and ulceration of the orifice
of the urethra - notwithstanding every care as to clea-
liness and keeping him dry. — It occurred to me
to substitute a wide-mouthed glass bottle for the tin
one which lay between his legs, and I am inclined
to think that this prevented the extension of the
ulceration.

Oct. 30th. Pain in shoulders and neck gone. The head is
still jerked forwards, on slight pressure of the back of
the neck. The appetite continues good, but there is
marked inanition. He is rather drowsy, when first
spoken to, but answers questions readily and coherently.

Nov. 3rd. The respiration is much more laboured, and
there is increasing inanition and prostration of
strength. The features are pinched. He has occasional
low muttering delirium, but is easily roused.

5th. Respiration painfully laboured. For the last two
days has been slowly sinking. He died at five p.m.

Postmortem Examination seventeen hours after death.
The whole of the cervical and four upper dorsal vertebra
were removed. On careful section the fifth vertebra
was seen to be displaced forwards nearly half an inch.
The cord was much compressed, and was nearly cut in two.
There was no appreciable softening of the cord, either above
or below the seat of injury. The intervertebral substance, between the fifth and sixth vertebrae, was compressed quite flat, and a minute fragment of the body of the sixth adhered to it, as it was carried forwards into the fifth. The anterior ligament was ruptured, and a distinct dislocation existed between the fifth and sixth vertebrae; the articulating processes remaining entire. See Drawing.

This preparation is now in the possession of Mr. Mackenzie. The points of interest in this case are: The fact of their being dislocation, without fracture of the articulating or other processes. The duration of life after the accident (34 days) considering the amount of injury done to the cord; and that there should have been no softening or other visible change in the cord round the seat of injury.

I must not enlarge on the importance of post-mortem examination, in this, as in all diseases and injuries of the vertebra, as without it, it is impossible to know the exact seat or nature of the lesion.

I have little doubt, that many cases of dislocation of the vertebra have occurred which have been regarded as fractures with displacement, and have been overlooked from the neglect of post-mortem examination.
Diseases of the Vertebra.

The morbid changes, both in form and structure, to which the vertebral column is subject, are very numerous. Among the most important and most frequently met with are the following: Angular, or antero-posterior curvature, lateral curvature, with or without interstitial abscession; Ankylosis; Malignant disease; and Congenital deficiency of parts of one or more vertebrae constituting what is called Spina bifida.

Acute Angular Curvature is the result of the destruction of the bodies of one or more vertebrae by changes, which is a disease originating in persons of strumous constitution. It is called into activity by exposure to cold or wet, external injury, etc., the degree of which, necessary for its production, bears an exact proportion to the degree of development of this diathesis in the individual. It affects people of all ages, but is most common in children and in adults between the ages of eighteen and twenty-five. Cases, however, are occasionally met with at more advanced periods of life.

In adults, its appearance has also been ascribed to nervous, excesses, and to chronic inflammation of the bones and ligaments of the spine following rheumatism. It is frequently complicated by abscesses, which,
according to their position, have been called Spinal, Psoas, and Lumbar.

The term, Spinal Abscess, is applied to those cases in which the collection of matter is confined immediately in front of the Carcious Veretbrae; when it burrows along the course of the Psoas muscle, it is called Psoas Abscess; and when it points in the loin, it is called Lumbar Abscess.

The appearance of this disease, in general, is first marked by manifest impairment of the general health, obstinate constipation, muscular debility, and disinclination for exertion. A dull gnawing pain, confined to one spot, aggravated by motion, and which is more severe during the night, is complained of. Percussion over the spinous processes elicits from the patient, an expression of increased pain, when the seat of the disease is reached. The carriage of the individual becomes characteristic. The head is thrown backwards between the shoulders, and the spine is kept peculiarly rigid and erect, to protect it as much as possible from motion. There is a sense of weight about the feet, the walk is feeble and tottering, the knees often give way, and the legs cross each other. The spine becomes curved forwards, and an angular projection of one or more of the spinous processes is observed. Atrophy of the inferior extremities takes place, and they are frequently affected by numbness and spasm.
A painful sensation of tightness and constriction of the base of the thorax, and upper part of the abdomen is often present, especially when the dorsal vertebrae are the seat of disease, or if there is much deformity.

The advance of the disease is marked by increase of pain, increased loss of sensation and the power of motion in the extremities, in many cases going on to complete paraplegia. The spasmatic twitchings of the extremities increase in frequency and violence, and a sensation of formication is complained of. Bedsores are apt to form, and, in the latter stages, diarrhoea is of common occurrence. The appearance and opening of abscess is generally followed by irritative fever, night sweats, increasing debility and emaciation.

These symptoms vary much in different cases, and many of them are often entirely absent; but there are always some in common, which, if carefully considered, will seldom fail to lead the practitioners to the recognition of the true nature and seat of the disease; nevertheless, in the early stages of the disease, it is extremely difficult to give a positive diagnosis.

As in injuries of the vertebra, the symptoms are modified by the situation of the disease.

In the upper cervical vertebra, pain in the neck and back of the head, is very severe, and is aggravated
by pressure on the crown of the head, or by sudden motion. The patient often supports his clinax and face between his hands, and in turning to look at anything, does so slowly, and moves the whole body, instead of rotating the head alone.

When an abscess forms, it generally makes its appearance among the muscles at the side of the neck, and sometimes bursts into the pharynx.

I saw a case (under the care of M. Guerous, at the Hospital des Enfants Malades in Paris) of caries of the upper cervical vertebra in which a large abscess presented itself at the back of the pharynx. The patient was a boy about eight years of age. On admission, a large collection of matter was found to be situated at the back of the pharynx, causing great distress, and impediment to deglutition and articulation. Two months afterwards, after the employment of the actual cautery, and suitable constitutional treatment, the state of the patient was much improved. The abscess had ceased to press on the pharynx, and the boy could speak quite distinctly and swallow without pain. In rising up in bed, or in lying down, which was done slowly, and with great care, he instinctively supported his head, with the hand placed behind it.

During the progress of the disease, the patient complains
of pains in the upper extremities, which, at a later period, occasionally become paralysed. The voice is often much affected. The appetite is capricious, the bowels costive, and evacuation is generally rapid.

Death is sometimes occasioned by inflammation of the membranes of the brain and cord, causing repeated convulsive seizures, and proving rapidly fatal. It sometimes occurs very suddenly, being occasioned by the destruction of the transverse ligament of the atlas, allowing the odontoid process to slip backwards, causing pressure on the medulla, and instant death.

Sudden death has also occurred, from an abscess connected with the diseased bones, opening into one of the larger arteries of the neck: but, in general, the progress of this disease is lingering and protracted, death ultimately taking place from exhaustion.

When the dorsal vertebrae are affected, there is pain at the seat of disease, but not so intense as in the cervical. The patient suffers much from a sense of tightness and constriction round the base of the thorax and diaphragm. When the curvature is well marked, the thorax is altered in shape, the sternum and ribs being projected forwards. The respiration is short and quick, and dyspnoea and tympanitis prove a source of much annoyance. Much complaint is made of shooting pains in the lower
Extremities, sometimes also in the upper, with impaired sensation. The patient becomes unable to maintain the erect posture. Incontinence of urine and feces supervene. Severe pain and involuntary twirling of the lower extremities follow any attempts at motion, and often continue for some time. Sores form on the sacrum, and over the trochanters, also often on the shoulders. The lower extremities become edematous. Sympathetic fever usually precedes the formation of abscess. Throughout the disease, obstinate constipation is present, and in the latter stages, often gives place to an obstinate diarrhea.

When the abscess is opened, either spontaneously or artificially, inflammation of the sac is a common result, which, in most instances, is rapidly fatal, from the extension of the inflammation to the membranes and cord, or, the continued, and continually increasing drain of pus from the system, induces hectic fever, under which the patient soon sinks.

After the separation of the sores, the suppuring surfaces sometimes take on unhealthy action, extending widely, and being attended by the constitutional symptoms which accompany prevalent infiltration.

In many cases from the absence of pain in the early stages of this disease, it has often made considerable progress before its presence is suspected,
but, when acute angular curvature is fairly established, the previously experienced difficulty disappears, as this can only be the result of the destruction of the bodies of the vertebrae by Caries.

When there is Caries of the lumbar vertebrae, the curvature is never so well marked, as the body or bodies of the affected vertebrae are rarely entirely destroyed before it proves fatal. Consequently, from the absence of pressure upon the cord, the loss of motion and sensation is less frequent.

As far as my very limited experience goes, this disease is of much more frequent occurrence in the dorsal vertebrae, especially in adults; next in the cervical, which is almost entirely confined to patients below the age of puberty; and next, in the lumbar, which is of equal frequency, before and after puberty.

The importance of discovering this disease, as early as possible, cannot be too much insisted on, as, if overlooked in the first instance, when surgical interference is of most service, though the patient may be afterwards cured, this cannot happen without more or less permanent deformity.
I. Case of incipient Caries of the Cervical Vertebra. Cure.

Anne Garrique, a. g. a stamious looking child, was admitted under Mr. Syme's care, on the 21st of April 1837.

She complained of severe pain in the upper and back part of the neck, especially when the head was inclined forwards, to prevent which she constantly supports her chin on her hand. This pain is aggravated by the slightest motion. It was first felt seven weeks before admission, after the removal of a blister which had been applied for some affection of the eyes. There is no appreciable swelling; the pain is more severe when the head is moved from side to side, than from before backwards.

A week after admission, the actual cautery was freely applied to the upper and back part of the neck. This was attended by so much benefit, that after the lapse of a month, the symptoms above described, had entirely disappeared. She could support and move her head without any pain.

Since her dismissal on the 22nd of May, I have been unable to hear anything further of this case, but, although there was not time to judge of the permanent benefit of the treatment, there is every reason to hope, that, with careful attention to diet, the maintenance of rest, and prevention of exposure to cold, this patient would remain well.
II. Case of Caries of the Dorsal Vertebrae. Case.

James Bowie, aged 22, farm labourer, was admitted under Dr. Mackenzie's care on the 12th of June 1831.

States that ten months ago, when at work, lifting a heavy sack of corn, he suddenly felt very weak and as if something had given way in his back; this was followed, after a few minutes, by numbness of the right leg; feeling quite unable to continue his work, he went to bed. After the lapse of several hours the feeling of numbness disappeared; he kept his bed for two months, at the end of which time he was able to resume his work, but the feeling of weakness in the back has never left him.

His symptoms on admission were: pain on pressure at the sides of, and on percussion over the spines processes of the fifth and ninth dorsal vertebrae, where an angular projection was observed; in walking, the touch was inclined forwards, and the motions of the lower extremities were feeble and unsteady. The bowels were constive; the appetite and digestion, good. His principal complaints were, a sense of general weakness and weight in the lower extremities unfitting him for his usual employment.

Three days after admission, the actual cautery was applied on each side of the projecting vertebrae, and the patient was ordered to take bad liver oil.
From the date of the employment of these measures, the pain in the back and other uneasy sensations were so much alleviated that, on the 9th of July, he insisted on going home, being then perfectly relieved from all his previous symptoms, and able to walk vigorously.

III. Case of Caries of the Dorsal Vertebra. Cure.

J. M. ap 25. domestic servant, was admitted under Dr. Mackenzie's care on the 3rd of April 1837.

This patient was a tall, robust-looking woman, with florid complexion; she bore the cicatrices of several abscesses in the neck. She has a slight inclination of the body forwards.

States, that twelve months previous to admission, she noticed a small projection in the lower part of her back, but for some time before, had felt great weakness in the back and shoulders.

On examination, a distinct angular projection of the tenth dorsal vertebra was seen. She complained of great pain and weakness in the lower dorsal and lumbar regions, and can only lie on her left side. She has great numbness of the lower extremities,
and occasionally, sharp shooting pain in the right groin, especially during the night.

Four days after admission, the actual cautery was applied on each side of the projecting vertebra, and constitutional treatment (consisting of syrup of the iodide of iron, Cod liver oil &c.) was resorted to.

She was quite relieved from the pain for a day or two after the application of the cautery, but, after that, the pain returned, and became, as before, as bad as before.

The actual cautery was again applied, but at this time, over the lumber region. A week afterwards, as the pain continued very severe in the right groin, and hip joint, shooting down along the inside of the thigh to the knee, it was thought advisable to put on a long splint. This gave great relief, and enabled her to lie on her back, which she had for some time been unable to do.

Two months after admission, all pain had disappeared. She expressed herself quite relieved, and was anxious to leave the house. She was however persuaded to remain in bed, and in the Hospital for another month, and, when dismissed on the 24th of July, was able to walk slowly without pain or inconvenience, with an almost imperceptible inclination forwards of the trunk. She had still difficulty
in turning round, which she did slowly and with evident constraint. However, she would remain no longer in the house. She had strict injunctions to continue the constitutional treatment, and to give herself as much rest as possible.

Saw this woman, five months afterwards, walking quite actively in the street.

With regard to this case, I think a mistake in the diagnosis, but not necessarily in the treatment was made. Refer to the symptoms apparently so well marked of disease of the right hip joint.

With regard to this, Sir Benjamin Brodie says, "As the disease advances, the patient, in some instances, complains of pain, which are referred to one groin and hip, such as may lead to the suspicion that there is disease in the hip joint; and, in fact, it is a very common error (and one into which, even doctors of great experience are liable to fall) to regard the symptoms of caries of the middle and inferior dorsal vertebra as indicating incipient caries of the hip.

That in this instance, this was the case I have little doubt, but at the same time, the manifest relief to the pain, which this complete prevention of motion occasioned, would encourage me to make a like experiment in a similar case.
IV. Caries of the dorsal vertebra with Spinal Abscess. Death.
This case showed symptoms of amendment during part
of its progress, but ultimately proved fatal.
John Raeburn aged 14. Kent boy was admitted under
Dr Mackenzie's care on the 12th of May 1832.
He states, that, for the last nine months, he has had
severe pain in the middle of his back, the origin of
which he ascribes to having been overheated, and
subsequently exposed to cold and damp in the fields.
Although not at first confined to bed, he felt
weak and incapable of exertion. His legs were often
cold and "prickling" (to use his own expression).
Six weeks before admission, he was seized at
intervals with severe spasms in the lower extremity,
which lasted for ten or fifteen minutes at a time;
these increased both in frequency and severity,
till a fortnight before admission, when he lost completely the power of voluntary motion.
On admission, an angular projection, about the middle
of the dorsal region, is seen, implicating the fifth,
sixth, and seventh vertebrae. On percussing
gently along the spinous processes, a dull deep pain
is felt at the projection; this pain is not materially
increased by motion, such as turning him on one side.
He has no rigors. When he attempts to
move his feet or legs, they are affected by severe pain.
which lasts for several minutes, and is sometimes so severe as visibly to shake the bed. This occurs independently of any attempts at motion; it also follows tickling the soles of the feet.

He has a heavy stupid look, and answers questions languidly and sluggishly. His appetite is good, tongue foul, and bowels constive. He has complete control over the bladder and rectum.

He is drowsy and sleeps much.

Two days after admission, the actual cautery was applied, on each side of the projection.

A fortnight after, the only perceptible improvement was total absence of pain, and the less frequent occurrence of spasm in the lower extremities.

He was put on a prone couch, during the day. After a week, motions to a slight extent returned. He was able to draw up his feet and legs several inches.

A month after admission, the skin became abraded over both trochanters, from being in bed during the night. He was ordered to sleep on the prone couch.

The actual cautery was applied above the seat of the former eschar. After a few days, remarkable improvement was visible. He could draw up and put down both legs at pleasure.

This transient improvement continued for nearly a fortnight, when the paralysis returned.
He was causticized a third time, over the lumbar vertebra, but with no benefit. His appetite became impaired, he lost flesh; the bladder and rectum became involved in the paralyses; his legs became edematous, though formed on the knees and toes, if he lay on the couch, and over the sacrum and trochanters if he lay in bed, in spite of every precaution, both as regards cleanliness and the constant use of water-pillows.

He gradually became weaker and weaker, and died on the 13th of August.

Post mortem examination 24 hours after death. Marks of recent pleurisy at the lower and back part of right lung. A small tubercular cavity existed at the apex of same lung. The left lung was gorged with blood, principally posteriorly. Liver pale - granular state of both kidneys. An abscess (the size of a flattened orange) enclosed in a thick cyst, occupied the position of, and hid from view the diseased vertebra. On opening this, a considerable quantity of very thick, flaky pus, mixed here and there with powdery specula of bone, issued. The body of the sixth vertebra was entirely destroyed by caries, as also the lower half of the fifth, which rested on the lower half of the seventh. The fourth and eighth vertebrae were bare and rough, but not decreased in volume. The abscess lay rather more to the right side, and
the heads of the sixth and seventh ribs, and of the eighth
left rib, were carious and bathed in pus.

The abscess was in progress of descent, for although
the pus was still partially confined, some of it had made
its way down to the lower margin of the tenth rib.
The membranes of the cord, could be distinctly seen in
the space between the carious vertebra. The state of
the cord was not examined.

The walls of the abscess in this case were
remarkably thick, and with the aorta lying over it
and partially binding it down, the appearance pre-
seated by the parts was remarkably like that of
Aneurism. The small drawing gives only an imperfect
representation of this resemblance. Plate vi.

The state of the cord was not seen, as it was thought
the preparation would show better nature, than in section.

The Paralytic must have been due entirely to the
pressure of the abscess upon the cord, as nowhere did
the bones impinge upon the membranes, and the
partial removal of pressure, by the descent of the pus,
must have given rise to the transient amelioration,
which, at the time, appeared to be the result of
the treatment.
Case of Caries of the dorsal vertebrae, with paraplegia. Death.

Wm. Creeve, at 13, was admitted under D. MacKenzie, case on the 21st of September 1832.

He was much deformed from anterior-posterior curvature in the dorsal region. No definite account of the duration of this curvature could be ascertained, but he said that his back had been so, as long as he can remember. A fortnight before admission, a small swelling, the size of a nut, was seen in the left groin. This had slowly increased, and was, on admission, the size of a hen's egg. It was prominent and full when standing, but soft and flaccid when in bed. He had no pain in walking. He was strictly confined to bed, and no change took place for several days, when the swelling became larger, and showed a tendency to point. He suffered much from irritative fever, and it was considered necessary to make an artificial opening. However, the next day, the tumour entirely disappeared, and he expressed himself relieved. The feverish symptoms recurred, and, on examination, a tense prominent tumour was discovered on the left side near the anus. An incision was made, and a large quantity of dark coloured pus was evacuated. As he seemed to suffer much from the retention of the pus, no attempt was made...
to encourage the healing of this opening. A poultice was applied
beneath the wound, and a large quantity of pus was discharged in large quantity
for several days, and he was apparently better, but hectic
superseded, and he died on the 21st of November.
Post mortem examination 24 hours after death.
In the chest, there were marks of old and of recent pleurisy.
The Liver and Kidneys were healthy; the Spleen rather pale.
Under the fascia, and along the course of the Psoas muscle,
a fluctuating tumour was seen on the right side. It ex-
tended from the lower margin of the diaphragm under
the right kidney, along the course of the Psoas muscle,
under Pannus legamentum to the right groin, on the outside
of the Femoral vessels; here it had a narrow rounded end.
The walls of this abscess were thickened and corrugated,
the having evidently at one time been much larger! It was
full of thick, flaky pus. In both these respects it pre-
sented a marked contrast to the one found on the
left side. Above this, and to its inner side, was a recent
abscess, extending from the second to the fifth dorsal
vertebra. Here, the vertebrae are laid bare, the intervertebral
substance projects, and the spongy texture of the Ver-
tebrae is filled up with putty-like tubercular matter.
On the left side, an abscess of greater extent existed.
Its origin was as high as the first dorsal vertebra.
It passed down along the course of the Psoas muscle to
the inguinal region (where it first pointed) then
along the course of the internal circumflex artery, to the
surface of obturator externus, it then passed along with it
beneath the glutaeus muscles, and gravitating downwards appeared beneath the fold of the glutaeus maximus.
The curvature involved all the dorsal vertebrae, from the
second to the twelfth. The course of the aorta was much
altered, it formed a tortuous bend backwards and to the
left side. The space where the bodies of the vertebrae
were deficient, was partially filled up by fibrous texture,
but there remained an excavation, in which three or four
fingers could be lodged.

The chief point of interest in this case, is, the existence
of abscesses in each different state of progress, the
lowest on the right side presenting thickened and
contracted walls and altered contents, evidently attrib-
utable to disease of much earlier date than that which
gave rise to the formation of the other two.

The fibrous texture found deposited on the anterior
surface of some of the vertebrae, may, taken in con-
nection with the contracted appearance of this abscess,
be regarded as an indication that reparative action
had at one time been in progress.

I have nowhere seen a case described, where (as in this)
two distinct abscesses, arising from disease of the
vertebrae, but separated by the breadth of the bodies
of the vertebrae from one another, existed. See page 52.
The extent of the deviation of the aorta from its course is also remarkable. The accompanying drawing gives only an imperfect idea of this. The aorta bore the shape of an exaggerated letter S. Plate vii. The preparation from which it was taken, is in Dr. Macneill's Museum.

VI. Case of Caries of the lower dorsal vertebra with lumbar abscess. Case of Andrew Henry, at 4, a pale, strumous looking child, was admitted under Dr. Macneill's care on the 2nd of January, 1852. The following history of the case was obtained from his father. "Eighteen months ago he fell on his back, while playing at school, suffered a good deal of pain in consequence, and was confined to bed for some days. About two months after (the boy being at school as usual) a small projection was noticed in his back, and it was remarked that he was not so fond of play, nor could he walk as erect as before. Five months before admission, he fell down several steps of a stair, and was again confined to bed. Soon after this a small swelling appeared at the right side of the former one. This has slowly and gradually increased." On admission, an acute angular projection, implicating the tenth, eleventh, and twelfth dorsal vertebrae is seen, as also a tense fluctuating tumour, the size of an orange, occupying the right lumbar region. He has little or no pain. His walk and appearance are very characteristic.
The head is thrown back between the shoulders, as if it were too heavy for the neck alone to support, and the spinal column is kept rigid. He has numbness of the lower extremities, is able to stand, but not to walk. He was put on a prone couch, and was ordered to takeCod liver oil, and a teaspoonful of the Vinum ferri three times a day.

Three days after admission, as the swelling was becoming more tense, and showed tendency to Ysent (to prevent, if possible, a spontaneous opening) a narrow-bladed bistoury was inserted at a dependent part of the tumour, and ten ounces of purulent matter, mingled with a little blood, were withdrawn. Care was taken to prevent the admission of air, and a compresses of lint, lightly supported by strips of adhesive plaster, was applied.

This was followed by no constitutional disturbance, and the small opening was found to be quite closed when the dressing was removed on the third day. The abscess slowly refilled, and, three weeks afterwards, was again tapped. It was not so tense, as on the previous occasion. Eight ounces of more healthy, looking inodorous pus were withdrawn. The puncture was made nearly an inch from the former one. On the third day, the wound was again healed.

Ten days after this, as there was slight attenuation and redness of the integuments over a small spot in the
upper part of the swelling, it was punctured a third time, and seven ounces of pus were removed.

He always feels relieved after its removal. This time the incision did not heal, a poultice was applied. On the ninth day, however, it had cicatrized, but there was still tendency to point at the part above mentioned. A week after this, the abscess opened spontaneously, followed by the discharge of a large quantity of purulent matter. This continued for several days, and he was very weak and much exhausted, requiring frequently small quantities of wine. The discharge daily diminished, the tumour entirely disappeared, leaving the angular projection much more marked. The general health became greatly improved, the discharge entirely ceased, leaving a small punctured cicatrix. The principal difficulty in the treatment was now met with, was to keep the boy in bed, as whenever he had an opportunity, he would slip out of bed or off his couch, and run about the ward.

He was dismissed on the 13th of July, with injunctions to continue the constitutional treatment.

Before dismissal, he could run about quite well, although, from the curvature, he had an awkward slouching look. When last heard of this child (February 1833), he continued well, and there was no appearance of any tendency of the disease to return.
This case may be considered as very satisfactory in its result, as general experience seems to say, that, when once a fistulous opening, in connection with lumber- or psoas abscess, is established, its closure is the exception.

Case of Caries of the dorsal vertebra with psoas abscess. Death.

VII. James Fitzsimmons, aged 21, Labourer, was admitted under Dr. MacKenzie's care, on the 9th of June 1833, on account of extensive disease of the left knee joint. The origin of this disease is far back as fourteen months before admission. For the last five months he had been completely confined to bed, and during this period, after suffering a good deal of pain in his back, a projection of the epiphysis process of the dorsal vertebra was noticed. This however gave him little trouble, except when he lay a long time on his back. He is unable to trace either of these affections to the receipt of any injury, but ascribes them to exposure to cold and wet.

In consequence of the rapid change for the worse which took place in the knee joint, the propriety of amputation of the thigh was taken into consideration. It was therefore thought necessary to make a careful examination of the state of the vertebral column.

The curvature was extensive, and very acute, implicating the dorsal vertebra from the fourth to the ninth.
No pain was occasioned by smart percussion over the pro-
fected. The result of this examination was a decision
that the chronic state of the vertebral disease did not
preclude operative interference. Amputation of the thigh
was accordingly performed a month after admission.
He never had a bad symptom, the stump healed within
the usual time, and his general health was much improved.
Although complaining of weakness, he continued well for
some time, and was able to be out of bed for several
hours every day. Soon after this, he felt less able to
rise, and complained of pain, referred to the upper part
of the stump. Swelling in the inguinal region and
upper part of the thigh appeared, and was attended by
increased suffering. This swelling in a short time
attained great size, and fluctuation became perceptible.
In the beginning of October, as it threatened to point
on the outer side of the thigh, it was tapped by small
incision, and a considerable quantity of pus was evacuated.
The incision healed, and the patient expressed himself greatly relieved.
The pus gradually reaccumulated, and, a month after
wards, from the return of the pain, it again became ne-
cessary to evacuate the fluid. Ten days after this, a large
quantity of pus made its way through the cicatrix of the first
tapping. This opening remained fistulous, discharging
large quantities of thick purulent fluid.
The further progress of the case was marked by great
inflammation of the general health, loss of appetite, increased frequency of pulse, great increase of discharge, return of pain in the back, profuse perspirations, hectic flushing, and great disorientation. Thursps formed over the sacrum, and at the seat of carciroma. He lingered in this condition till the 20th of March 1853.

Post-mortem Examination 24 hours after death. The 7th 8th and 9th dorsal vertebrae were found extensively affected by carcioma, the body of the 9th being entirely destroyed. The walls of the abscess on the left side were thick and compacted, having evidently undergone considerable contraction. On the right side, a recent abscess existed, opening into the hip joint. Deep and extensive bouses were found over the sacrum, and projecting vertebras, laying bare their spinous processes.

This is another instance in which double paras abscess existed, and I have since found similar cases recorded, which inclines me to modify the statement made at the foot of page 36.

In a patient in whom the constitutional cachexia was so strongly developed, and in whom two local manifestations of its presence existed, the removal of one of these, although absolutely necessary, from the want of the symptoms, could not be undertaken with the same prospect of success as would have been the case, had the knee alone been affected; and it may be a subject of speculation, what influence the removal of one of these had, in reconciling, in an aggravated form, the disease in the remaining one.
Abscesses, resulting from Carious vertebrae, make their appearance in various positions.

The most frequently met with are those approaching the surface on the inguinal and lumbar regions. The next in frequency are those which appear in the hip, the neighbourhood of the rectum, and outside of the thigh. They are occasionally though rarely met with in other situations, viz. in the intercostal spaces, or through the abdominal parietes or even opening into the intestinal canal.

A case is related at page 46, where a double loins abscess existed. The symptoms attending the appearance of pelvic and lumbar abscesses are variable. It is most frequently incipient, slow in its progress, unattended by pain, and in these cases is not recognized till a distinct fluctuating tumour is felt. At other times, its formation is rapid, accompanied by pain in the loins, aggravated by walking. When in the recumbent posture, the thighs cannot be raised or extended without pain. Sometimes obscure pains are complained of in the hip and thigh extending to the knee, caused by pressure on the nerves supplying these parts. If the abscess is sealed in a thick cyst, it may continue for a long time in this state, causing, by its presence, pressure on the cord and consequent paralysis; the abscess becomes more extended, and the heads of the ribs, as well as the surrounding vertebrae, from being constantly batted in pus, become involved in the destructive action. The
walls of the cyst become more and more attenuated from its increasing contents, and the matter beneath reaches the surface.

These abscesses are liable to be mistaken for other affections. When they appear in the groin or in the course of the spermatic cord, they may and have been mistaken for hernia, as many of the attendant symptoms are common to both, such as impulse or coughing, prominence when in the erect, and flatness or sudden disappearance when in the recumbent posture; the swelling can often also be returned, to a great extent, into the abdominal cavity. They can generally, however, be distinguished by the presence of fluctuation.

Some difficulty may also be experienced from pulsation communicated to the tumour by large arteries in its neighbourhood, simulating aneurism.

These mistakes are more apt to occur in either of the two following conditions; either when the abscess makes its appearance at a distance from the seat of disease, or, from the absence of angular curvature in many cases of Caries of the lumbar vertebra.

But I cannot imagine that curvature in the dorsal region should be overlooked, as it must always be well marked before the formation of all abscess the appearance of abscess.
is given a Prognosis with any degree of certainty in this disease, is a matter of very great difficulty, but experience seems to show that the great proportion of these cases terminate unfavourably, and, if a good Prognosis is given, it must always be very guarded. Care must be taken in every case where deformity already exists to warn the patient, or his friends, that, with the best possible issue of the case, the deformity will be permanent. I know of two cases, where this had been neglected, and although the case was satisfactory in every respect, in one case, the ignorant relatives, in the other, the patient himself ungratefully charged the surgeon with improper treatment. This unpleasant occurrence can always be avoided, by the positive statement of the surgeon, the first time he sees the patient.

The Prognosis is also a good deal influenced by the nature of the exciting cause of the disease. The circumstance of its being lighted up by a severe injury, in a case in which the strumous diathesis is not strongly developed, would incline one to expect a more favourable issue, than if the disease had originated from a comparatively trifling or unappreciable cause.

While investigating this subject, I met with the following case of exfoliation of the vestebra dentata, which I here detail, as an illustration of the amount of change which may take place in the most important part of the vertebral column, consistently with recovery. It is recorded...
by Wythe in the Medical and Surgical Journal Vol XXV p. 310. The subject of it was a man, at 35. He consulted Wythe on account of difficulty of swallowing, which he had experienced for twelve months previously, and which had lately become very distressing. On examination, a tumour situated at the back of the pharynx was observed, which being incised gave rise to a quantity of pus. The wound healed, and two months after, only a slight fulness remained. No fluctuation was perceptible, but the patient complained of severe pain, and could not rotate his head. Wythe then made an incision into the bony swelling of the pharynx, and found that the bones were extensively diseased. The general health became much impaired. Three months afterwards a piece of bone projected into the pharynx, which Wythe made several ineffectual attempts to extract. Two days after, the piece of bone made its way out and was removed by the patient from his throat.

In the Treatment, the first and great object is the maintenance of absolute rest, as without it, no cure can ever be hoped for, or obtained.
The best mode of accomplishing this object, is the maintenance of the horizontal posture, either in the prone or supine position. For the latter, all that is necessary, is a well and equally stuffed bed, with a single pillow for the head. For the former, the simple prone couch, figured at Plate 19, is the best. The patient should be accustomed to this position by being lifted on the couch for several hours daily, gradually increasing the time, till he can lie with comfort for twelve or fourteen hours at a time, or even sleep on it. The position is often complained of at first as being irksome, but I have always noticed, that, after a short time, it was preferred. This couch is especially adapted for children, for many reasons. They can be easily and gently removed from bed to the couch and vice versa. The couch may be constructed on wheels, so that they may be moved about the room, or into the open air in mild weather. The weight of the body is more effectually removed from the spine; pressure on the projecting vertebrae is avoided, and paraplegia is retarded, as the pressure of an existing abscess is kept from the cord. One apparently serious objection has been raised to this mode of treatment, viz. the flattening of the ribs and anterior part of the chest by pressure, but I have never seen this occur, and, allowing that it did, as there is always some or less change in the form of the thorax, when the curvature is great, it may as well take place in this direction as in any other. It is also of great
service when local applications are necessary.
The same arguments apply in the case of adults, with
the exception of the feet, as from the greater weight and
size of an adult, transference from one to the other is not
as easily accomplished. But even this objection is overruled
by the manifest advantage and convenience, both to patient
and practitioner.

A movable drawer, coated with zinc, is a great addition,
and is essential in cases of incontinence of urines.
The integuments of the knees are apt to slough from the
continued pressure, but this may be obviated by a
water-pillow placed below them.

It is always difficult to persuade the patient of the ab-
solute necessity of the maintenance of rest, after the acute
symptoms have passed off. The only way in which a
cure ever is, or can be obtained, is by the approximation
of the diseased bones, their union first by soft substance,
subsequently by the deposition of new bone round them,
forming a firm casement. The gap between the bones
is never filled up by new bone. P. 187. In one or two
of the dried specimens of cure of this disease, which I have
seen, the bones seem almost to be fused into one another,
but this, of course, must have been the work of a long time.
The next indication is to subdue any appearance
of inflammation, or to prevent its approach, if possible.
The restoration of the general health is also all important.
This is best accomplished by a regulated diet, nutritious and at the same time easily digested. Cod-liver oil and preparations of iron and iodine are highly useful. The oil should be administered in small doses at first and gradually increased. Iodine and Cod-liver oil may be advantageously mixed together in the proportions of a grain to the once; this requires to be very well shaken to obtain accurate mixture. The dose is from an ounce to an ounce and a half, or even two ounces daily.

If the patient, after repeated attempts cannot take the oil, it should be omitted altogether, or at least for a time, as, under these circumstances, it has appeared to me to do more harm than good.

In convulsive children, the serious fever, in doses of a teaspoonful twice or thrice a day, will be found of use. Care must also be taken to maintain the regular action of the bowels. The good effects, which follow the administration of Cod-liver oil in children labouring under this disease, are often wonderful.

Counterirritation should not be resorted to, unless when the pain at the seat of disease is severe, and is not relieved by rest. This seldom if ever required in the case of children, except when the cervical vertebrae are affected, but, in adults, it is often necessary and highly beneficial in the early stages.

For this purpose, Canetic issues, letoue, Moxas &c. may
be employed, but the actual cautery is to be preferred. It is always as effectual, and has the advantage of being more safely regulated.

I have not seen much, if any advantage from counter-irritation after the formation of abscesses; but many surgeons, whose opinions are entitled to respect, employ counterirritation throughout the disease, and apparently with good effect.

If, in an acute case, the formation of abscesses is suspected, the local abstraction of blood, by means of leeches or cupping glasses, should be resorted to. This should be followed up by counterirritation.

When the abscess has advanced either slowly and gradually or rapidly, and approaches the surface, the treatment, which I have been adopted, and which appears to me to be the most successful, is to puncture it with a narrow bistoury, and encourage, as far as possible, primary union of the wound.

If this does not occur, we are no worse than we would have been, had the abscess been allowed to open spontaneously, which it certainly would have done sooner or later. The tapping is to be repeated at intervals depending on the reaccumulation of pus. A spontaneous opening is always to be avoided, if possible.

The case of Henry (page 47) and the following case, which came under my notice, are both illustrations of the
advantages of this method of treatment. The subject of this case was a child three years old, a patient of Mr. Whitley's, whom I saw with him on the 13th of December. A large lumbar abscess existed, which was diffused from the tenth dorsal vertebra to the upper margin of the sacrum. No chronic processes could be felt from the tenth downwards. They first noticed three weeks before. The interments of the abscess were red and inflamed, and showed a tendency to point. An abdominal trocar was inserted, and ten ounces of purulent matter were evacuated. Care was taken to prevent the admission of air. When the cannula was removed, the chronic processes of the vertebral, which had been covered by the abscess, could be felt, and that of the tenth was seen distinctly prominent, and forming an angular projection. A graduated compress was applied. Primary union of the wound did not take place, and pus continued to discharge for several days, but at the end of a fortnight the wound closed, no reaccumulation of matter took place, and at present (March 21st) the child continues well. This case, and the preceding one, the one acute, the other chronic, show the advantage derived from this mode of treatment. Mr. Abney's point recommended and employed with success this procedure. Every case must be taken to prevent the admission of air. This is best done, by keeping up gentle and uniform pressure round the opening, and stopping whenever the flow begins, becomes slower. A compress of lint, and a bandage
should then be lightly applied. The chief danger is inflammation of the edge of the abscess, following the introduction of air. This is known by local redness and pain, followed by the escape of fetid putty and pus from the wound. The only chance now left for the patient is free evacuation of the contents of the abscess, but the inflammation is seldom checked, hectic supervenes, and death speedily follows. Another mode of death is from the erosion of one of the arteries in the vicinity causing fatal haemorrhage. This however is a rare occurrence.

A case is mentioned in Connecticut Medical Journal Vol IV p 35, where the costal was opened into by ulceration of the walls of an abscess in connection with cancerous vertebra.

A case is mentioned in the Dublin Medical Journal (Vol IV, page 24) where ulceration of a portion of the ilium, which adhered to the cyst of the abscess took place, and the faces passing into the cyst, escaped by a fistulous opening near the spine of the ilium. Ulceration of the iliac artery, an inch and a half from Poperti ligament followed, and sudden death was the result.

In Stafford's Treatise on the Spine, Cases sudden death from ulceration of the vertebral artery are noticed.

Undoubtedly the most unfavourable cases are those of Caines occurring in adults, complicated with large abscesses but even these are not to be deepened of at first, for
when in these, as in other surgical diseases, an apparently hopeless case recovers, a precedent is given, which tends to give rise to hope against hope. In cases of spinal disease, which become chronic, or when treatment is believed to be no longer necessary, it is always necessary to warn the patient against over exertion of any kind, and especially to be careful in avoiding all sources of injury to the spine; as reaccumulation of the disease is at all times extremely liable to take place.

A remarkable instance of the neglect of this precaution occurred in the case of a young man, who was under Mr. MacKenzie's care on account of I. abscess in connection with disease of the vertebral. At the commencement of his residence in the hospital, he was hectic, much emaciated, and apparently sinking from the constant drain on the system of large quantities of pus. Under suitable treatment, he rallied, his appetite returned, he became fat and strong, and before he left the hospital, only about a teaspoonful of matter was daily from the wound. At the end of a week after his dismissal, he missed his foot in walking, and fell, he was carried home, and died within five days after the accident.
Lateral Curvature of the Spine.

This affection is of a totally different nature from that just described; there being at first no structural change either in the bones or muscles. It is a very common affection, and there is too often, little or no attention paid to it in the first instance. Its approach is insidious, and its progress generally slow. It is met with both in males and females, but by far the greater proportion are females. The most common period of its occurrence is during adolescence, the age varying from six to twenty.

There is no structural alteration in the first instance, but from the long continuance of the bones and muscles of the spine in the position, and from unequal and constant pressure on one side, they become atrophied, or at least are prevented from expanding to the same extent, as those of the other side; hence, the distortion, from being long unattended to, becomes permanent and irremediable. The curvature is almost invariably from left to right, commencing in the dorsal region, the convexity of the curve being on the right side. Soon, however, a compensating curve of the cervical and lumbar vertebra takes place, in order to maintain the body in Equilibrium. Note. The inferior border of the right scapula projects, and the hip on the same side appears larger than the other.

With the increase of the curvature, the thorax becomes
altered; the ribs become raised and approximated, and at the same time carried forwards, so as materially to diminish the capacity of the chest from above downwards, while it is increased from before backwards. When the curvature is very decided, the capacity of one side of the chest is much greater than the other, as on the curved side, the ribs are approximated, while on the other, they expand. The consequences of these changes are, dyspnoea, incapability of taking a full inspiration, palpitation, and an irregular pulse. The abdominal cavity is also much altered, and the sternum becomes approximated to the pelvis.

A most important and characteristic feature of this disease is mentioned by Mr. Syme, viz., that "the limbs and pelvis are never affected." The recognized causes of this affection are, Constitutional weakness, the habitual use of one side of the body more than the other, as in the case of blacksmiths, young nurses carrying a child constantly on one arm. Sitting or standing in awkward positions, badly made clothes, the improper use of stays. Sedentary occupations requiring a habitually stooping posture, all tend more or less to produce this deformity.

The remedy is simple, and if timely and long enough employed, is also generally satisfactory. In cases where no constitutional weakness exists, the
abandonment for a time of the hustling exercises, together with a more equal use of the arms and muscles of the spine, will generally be found sufficient; but, as in the other form, this may also be accompanied with benefit by rest in the horizontal posture, in the first instance.

Endeavours must be made to improve the general health and strength of the patient. The best of the treatment consists in: the application of stimulating liniments to the spinal muscles; sea bathing, or in winter, the warm baths; exercise in the open air; regulated diet; and warm clothing. The numerous ponderous and clumsy machines, which are from time to time invented for the relief of this deformity, are one and all bad. But even although they were good, why use them, when every indication is fulfilled by the treatment mentioned above? It would be well for every one, practitioners as well as patients, and these would be less quackery, could they be led to understand, that the simplest remedies, and those dictated by common sense, are always the best.
Arthritis.

The vertebral column is occasionally but fortunately rarely liable to a serious affection, which is not generally noticed in surgical works.

It is a chronic inflammation of the bodies of the vertebrae, causing rigidity, and ultimately ending in ankylosis. New bone is deposited, sometimes in large quantities on the front of their bodies. The bones are actually fused into one another, and the appearance presented by the dried bones, is exactly as if a thick fluid had been poured down the front of the vertebral column, and allowed to congeal there. Plate XI.

Several very remarkable examples of this affection are to be found in the Musées Bâtiments in Paris. One in particular, the subject of this case had been liable to constant attacks of gout, almost every articulation in the body was jointly ankylosed. Certainly every one of importance, with the exception of the left hip joint.

Little can be done for this disease. Dr. Benjamin Rush recommends the long continued use of small quantities of mercury.
Malignant Disease.

Although in all cases, an accurate diagnosis is desirable, it is often impossible to distinguish between the advanced stages of Caries, and the symptoms of malignant disease of the vertebral column. These are however one or two circumstances, by which we may be led to infer its existence, without positively ascertain its presence.

In general, the patient is much more advanced in life, before any indication of its existence is given, and in all the cases noticed by Sir W. Brodie, it was preceded by malignant disease of some other organ, such as the brain, testicle, prostate &c. This disease is fortunately rarely met with, as it is necessarily incurable, and this circumstance makes it of less importance to make an accurate diagnosis.

The following very interesting case is a good example of this disease; it also shows the extreme doubt which clouds the attendant symptoms, as so many of these are induced during the progress of Caries of the Vertebral column.

George Muir, aged 48, was admitted into the Surgical Hospital in July 1849, on account of fracture of the ribs. He remained under treatment here for three or four weeks, when he had an attack of fever, for which he was transferred to the Medical House, under Dr. Patterson's care. In a short time, he became convalescent, the cough and dyspepsia
having entirely disappeared. His general appearance was healthy, his habit of body was square, but not emaciated. He was found to suffer from pains of a great intensity in the knee and hip joints. These were supposed to be rheumatic and were treated accordingly. He was otherwise apparently well, the circulation was tranquil, the skin cool, the tongue clean and moist, and the functions normal.

On his forehead was observed a soft elastic tumour, almost fluctuating, the size of a very large walnut. He said this had existed for some years. It was apparently adherent to the cranium, and was supposed to be an unbursted tumour of the scalp. No benefit was experienced from the remedies employed, on the contrary, an increase of pain and stiffness in the lower extremities was observed after a few days. This was rapidly followed by loss of motion and sensation of the lower extremities, retention of urine, and involuntary evacuation of feces. The patient complained of severe lancinating pain in the lumbar region, and excessive suffering attended the slightest attempt at motion of the trunk.

As the disease progressed, the paralysis involved successively the abdominal and intercostal muscles, respiration latterly being carried on by the diaphragm. During the last few days of his life, the lower extremities became quite rigid, coma gradually ensued, and he died on the
Post-mortem examination 24 hours after death.
The surface of the scalp presented several tumours, which had
a distinct, almost fluctuating feeling. The largest of these was
the size of a Lemon, and was situated on the left side of
the frontal bone. There were three others which were much
dsmaller, two were round, these lay on the parietal bone,
the other lay immediately below the occipital prominence.
It was elongated in the axis of the bone. On reflecting
the scalp, these tumours were found to be intimately con-
ected with the bones, and were beneath the pericranium,
which was very thin at some points. On removing
the calvarium, the inner surface of the bone was found
to be the seat of similar tumours but of smaller size. These
corresponded accurately in situation with the external
tumours, and were closely adherent to the outer surface
of the dura mater. They could not be separated from
the bones except by laceration. The affected portion of
bone presented, on their removal, a leathery surface,
not much altered in colour, but depressed below the
level of the rest of the bone. Around the tumours,
the inner surface of the bones was thickened by small
perpendicular excavations, forming a network of new bone.
The consistence of the tumours was soft; in some parts
they seemed almost diffusible, and yielded a purplish
orange juice, like the "prune juice" affectionation of the
brain. The brain appeared healthy, as also the spinal
cord, and there was evidence of pressure on any part of it; but there was a small tumour in the lamina of one of the lower dorsal vertebrae, similar to those already described, this did not project internally. About an inch below the prominence of the sacrum, the bone was softened for a space of two inches in diameter, and was the seat of an irregularly shaped morbid growth, which projected slightly upwards towards the rectum, but scarcely at all outwards. The fourth right rib was fractured, near its anterior fourth, and, between the fractured ends, covered by periosteum, was a tumour the size of a pigeon's egg. When punctured, a good deal of innumerable juice escaped. The consistence of this tumour was softer than that of any of the others. On the fourth left rib was a tumour almost identical, but the continuity of the bone was not lost. The periosteum was involved in the tumour, and was so thin as to be at part not distinguishable as a membrane. The heart was normal. In the upper lobes of the lungs were a number of continued nodules, of a lobular form, and soft brain-like consistence, closely attached to the pulmonary texture, but not suctioned. The liver was pale and soft, and at various points were seen small brain-like masses the size of a pea. The spleen and kidney were very soft. The tissues of the liver and kidney were considerably granular under the microscope. Structure of the Carcinosus masses. All these masses presented much the same physical properties. They contained here...
and those evidences of vascularity, chiefly hints of redness, without any arborescent disposition, but they were generally of a yellowish cream colour. All the masses were examined by the microscope. They contained multitudes of free nuclei from \( \frac{1}{100} \) to \( \frac{1}{200} \) in. in diameter, mostly more or less granular and angular in form. Cell walls very irregular and in perfect sometimes existed around the nuclei, especially in the lung. These cells were rarely more than \( \frac{1}{100} \) an inch in diameter, and the cell wall seemed pretty closely drawn around the nucleus, which was of the size above described. Acetic acid usually made the cell wall fainter and revealed the nucleus. In the purple zones were seen round nuclei, rather granular, similar in size and appearance to pus corpuscles, but presenting no distinct nuclei on the addition of acetic acid.

This case is chiefly interesting as showing the great amount of structural change, which may take place, without producing much impairment of function, as it is obvious that the cancerous deposition originated long before symptoms of disease of the vertebra made their appearance. This can only be explained by the very gradual progress of these changes, and from the absence of disease of the cord and its membranes.

At an early period of the case, the symptoms presented closely resembled those of inflammation of the membranes.
of the spinal cord, and its subsequent progress seemed to denote an extension of the disease to the substance of the cord itself. This was believed to be the nature of the case by the Medical Attendants, no connection having been traced between the tumour on the forehead, and the symptoms present.

This Case further illustrates the remark made by Dr. H. Brodie, that malignant disease of the vertebra is always accompanied by cancerous deposits in other parts of the body.

Spina bifida.

The last but certainly not the least important affection which claims attention is that called Spina bifida. This is a congenital affection, and is as variable in its symptoms and effects as any of those just described. It arises from an incomplete formation of some part or parts of the vertebral column, during foetal life. The deficient parts generally are the epiphysial processes of one or more vertebrae. The membranes being unsupported by bone at the part protrude, this is aggravated by a morbid increase in the fluid contained in the arachnoid membrane. At birth, the tumour is generally small, and fluctuating. Sometimes no tumour exists at first, but the deficient part is marked by a discoloured spot, which gradually enlarges. It has occasionally been met with so large as to cause the death of the child during parturition.
Its shape is modified by the amount of deficiency of the bony column, being met with, rounded, oblong, and oval. Its general colour is that of the surrounding integuments, but even this also is variable. It is sometimes almost transparent, at others quite bright red, or livid. Fluctuation is always perceptible. On pressure, the tumour diminishes, and can be made to disappear, then the gap, where the bones are deficient can be distinctly felt; this, however, can be rarely done, without producing pain in the head, convulsions, or some other indication of cerebral derangement.

In some cases, its presence causes no derangement either of growth or function, those affected with it being healthy and well developed. In others, and perhaps the majority of cases, the lower extremities are atrophied, and there is more or less deficiency of voluntary motion and sensation, also incontinence of urine and feces, diarrhoea, convulsions, emaciation and general debility; but none of these symptoms are invariably present. It is often also associated with some other disease or congenital deficiency, as hydrocephalus, haemiplegia, club-foot &c. It is a similar disease, and is often associated with hydrocephalus: when this is the case, the floor of the fourth ventricle is deficient, so that there is uninterrupted communication between the fluids, and pressure on the tumour below forces it up on the base of the brain, it then passes through the fourth, third, and lateral ventricles, and produces
all the symptoms of hydrocephalus.

The situation of the tumour is generally the lower part of the lumbar region, close to the sacrum, but it has been found in other parts of the column.

Sometimes the spinous processes in the whole length of the canal are defective. A double communicating tumour has been seen, the intervening space remaining perfect. Cuvilliers mentions a case where the deficiency was in front. It is also sometimes accompanied by a similar tumour on the head; in these cases, the root of the occipital bone is deficient.

Elizabeth Mackenzie, 4½ years old, was admitted under Dr. Mackenzie's care, on the 4th of August 1852, on account of spina bifida. A tumour the size of a very large orange persisted over the lower lumbar region, and upper part of the sacrum, it extended slightly downwards on left side.

Her mother states that the tumour was very small at birth, it enlarged very slowly, till she was nearly two years old when she began to walk. It has increased more rapidly during the last year. Her head became sensibly larger when she was teething; she could speak well at eighteen months.

She is intelligent and active, fat, healthy and well developed, is apt at learning, and has a retentive memory. She has never had convulsions, and has enjoyed uniform good health. The head was carefully measured, its
circumference was 23½ inches. The tumour is very tense, of the same color as the surrounding integuments, except at two points, where it is almost translucent, thinly covered, and shows a disposition to point.

On the day following her admission, it was tapped at the lower part by a very fine trocar and canula. Eleven ounces of clear serous fluid were withdrawn. She did not suffer the slightest uneasiness or pain in consequence. The sac was quite flaccid and soft, but not entirely emptied.

A large graduated compress was placed over it; this was lightly supported by straps of adhesive plaster.

Five days after, the tumour had refilled, but was not so tense as before. Ten ounces of fluid, as clear and transparent as before, were removed, and with the same good result.

In the same manner, six days after the second tapping, eleven ounces of fluid were removed. No uneasiness was complained of at the time. Two hours after, I was sent for, and found her complaining of severe pain in the head, accompanied by sickness and vomiting; this passed off in the evening. Next day she was pretty well, the pulse was rather more full and frequent than natural - A purge which was administered rectified the vomiting.

She passed a restless night; had severe frontal headache, sickness and vomiting, and had had no motion of the bowels. A purgative enema was ordered, and mustard was applied to the epigastrium.
The head was carefully measured, its circumference was exactly 24 inches, so that it had decreased more than a third. Next day, the pulse was still full and frequent, the general surface hot and dry, and tongue foul. Four leeches were applied to each temple; these had the effect of removing the pain. The bowels were again moved by enema. All pressure was removed from the tumour.

On the following day, cold cloths were applied to the head, a diaphoretic mixture was ordered, and the leeches repeated. The pain and throbbing in the head returned on the following morning, and the patient was drowsy and fretful. The head was shaved, and a blister was applied to the nape of the neck. The bowels were again moved by enema.

This treatment was followed by marked improvement, and the inflammatory symptoms passed off. The tumour resumed its former size, but was not nearly so tense. The child continued to improve, and on the 8th September was quite as well as before the tapping. The mother being unwilling that any further surgical interference should be resorted to, she was discharged. See Frontispiece.

I can only account for the inflammatory symptoms which succeeded the third tapping, in either of the two following ways. Either that the abstraction of the fluid was too rapid, or that too great a quantity was
removed, causing too sudden a removal of pressure.
Dr. perhaps the best explanation is that, in the throat tapping,
some of the nervous filaments in connection with the tumour
were injured.

I cannot help thinking, however,
that this case was perfectly well suited in every respect
for surgical interference, and I would not hesitate in
a similar case, to employ the same treatment.

As it was, the size of the head was considerably dimin-
ishcd, and I believe, had the friends of this patient
conented, and the treatment been patiently and
long enough persevered in, the result would have
been a cure to add to the very few which are now on record.

I have only seen two other examples of this affection.

One was brought to the Hospital, unfortunately after the hour
of visit (when the child was three weeks old) and did not
return till three months after, when the tumour had great-
ly increased in size, and symptoms of hydrocephalus were
well marked. The annexed drawing illustrates this case.

When Dr. Prat saw this child, no tumour existed, but the
integuments were flaccid and red, indicating where the
nervous processes were deficient. It appeared to me to be a
very suitable case for moderate pressure - the tumour
rapidly increased in size, and the head continued to enlarge.

Convulsions became frequent almost daily - spontaneous
opening of the tumour took place, and the child died two days after.
It is rather a curious coincidence, that the mother of this child (now 9 years old) was very much deformed by acute angular curvature. The other case, that of a child three weeks old, was admitted under the dye, but was not considered by him to be a suitable case for interference of any kind.

The occurrence of this affection is rare, and the prognosis, as may be gathered from the opinions of every author that have been, is as a general rule unfavourable. Still I am inclined to think that, were the subjects of it seen in proper time, and carefully treated, much may be done to alleviate if not to cure this formidable affection; at all events life in many cases might be prolonged.

A great obstacle to this however, is fear of any interference whatever on the part of the mothers of these children, and their erroneous notion of waiting a little longer to see if it increases, or, in too often vain hope that perhaps the child will become stronger as it grows older, and then will be more able for treatment. It might be said that experience should teach us not to interfere with these cases in any way, as hitherto, with one or two exceptions, it has been fruitless; from this I entirely dissent, as it is only by more extended experience, that the conditions favourable to the success of surgical interference can be ascertained, and if only one case in fifty is saved in this way, the surgeon has the gratification of having saved
one case from early and almost inevitable death.
Both spontaneous and artificial cure has taken place.
One or two cases are on record, where patients have lived
to the ages of twenty or twenty-five, without any interference,
whatever, but in these cases the tumour proved a great
source of inconvenience on account of its size.
The most remarkable case of this kind, which I have met
with, is related by Mr. Prescott Hewett, in the London Med-
ical Gazette, for 1844 Vol. XXXIV. p. 460. It was in the
Case of a washerwoman aged 25, delicate looking, but in good health.
The tumour was the size of a child's head, and was sit-
uated in the lumbar and sacral regions. For several
years it had not increased. The back was very pain and
stiff, and had a broad base. Per legs were unaffected,
and no pain was occasioned by pressure, or a sharp
blow on the tumour. When sitting, the urine dribbled
away, but not when walking. She was a hardworking
woman, and had always enjoyed good health.
This and similar cases must be regarded as among
the rare exceptions which are met with in every form
of disease.
There is no denying that this
affection is a very hopeless one, and very little ame-
able to treatment, on account of the danger of exciting
inflammation of the cord, and its membranes. Nevertheless,
it is a disease which is of much practical interest to the surgeon.
Several modes of treatment have been proposed, but
all have not been practised. Among these may be mentioned
Ligature (Mr. R. Bell). The introduction of wires (Desault).
Counterinfluenza at a distance from the tumour (Rietter).
Favourable results have only followed the most rational
methods, viz. Compression of the tumour, or, frequent
incisions by a small instrument and subsequent pressure.
These were first proposed by Dr. Abernethy, and first
succeeded in the hands of Dr. A. Cooper. One of his patients
the subject of pressure, was alive and well at the age
of 28. The other in whom incision was employed was
also alive and well at the same age.
Spontaneous cure may follow the bursting of the tumour.
Its walls separate, and become subsequently consolidated.
by coagulated lymph. This is also the most frequent
way in which death occurs; the bursting of the tumour
being too often followed by inflammation proving
rapidly fatal.

In a preparation of Spina bifida, which I had an
opportunity of examining, the cord ends abruptly
above the tumour; and its anterior and posterior col-
umns exist as a flat lamina, spread over the dil-
lated membranes, so that the cord is at this part
as yet in its embryonic state, not yet called upon itself.
This flattened lamina again collects, but imme-
diately breaks up into the cauda equina.
The component parts of the tumour are, the fluid, the
the malarial covering of the cord, with its arachnoid lining and
the integuments. Numerous filaments are very frequently
connected with the sac, more especially if situated in
the sacral region. To avoid injuring these, the fracture
should never be in the midline, but to either side,
and in a dependent part of the tumour. For this purpose
either a grooved needle, or a very small trocar and cannula
may be employed; the latter, I think, is preferable.
Great care must be taken to prevent the admission of air.
The tumour is to be emptied by gentle and gentle
pressure of the hand, behind and above the canula.
The patient should be sitting or half-reclining; and
no more fluid must be allowed to escape, if any symptoms
of pain, or syncope from too sudden removal of pressure occur.
Neither should it be entirely emptied. A compress of lint
and a bandage, or long strips of adhesive plaster may now
be lightly applied, so as to maintain moderate and
equal pressure. After the lapse of a few days, if the tumour
has refilled, this is to be repeated, and so on, at intervals
depending on the reaccumulation of the fluid.

It has been proposed by Dubourj, to enclose the tumour
in elliptical incisions, and unite the edges by suture.
This, of course, could only be done where the tumour was small.
I cannot help thinking this bad practice, as it must neces-
cessarily be attended with much more danger, and
the same result may be attained by the safer means.
of structure and pressure. Besides, when the tumour is small, it is much more likely that pressure will exceed.

"There is no evidence that the defective part is ever repaired by specific matter, and cure is only effected by the consolidation of the soft parts." (Stafford on Diseases of the Skin)

I believe that the subject chosen for a thesis should be a practical one, both because it is the most useful to the student, and by it, can best be seen the opinions of the writer, and how far he has benefited by the instructions of his teachers.

I am aware that many weak points exist in the foregoing pages, and perhaps it may be thought that sometimes I have expressed my opinion too strongly. For this, Ernest plead want of experience, as the number of cases of a particular class, which come under the notice of the student, attending a general hospital, is necessarily very limited. If some of the subjects I may have said too much, and of others too little, but the chief difficulty, with which I have had to contend, was to keep these observations within proper limits, as the subjects individually are of so much interest, that as much, or more might be said of each of them.

Robert Moor.
Explanation of the Plates.
Plate I represents...