CASES
OF
FRACTURE
OF
THE NECK OF THE FEMUR;
WITH THE
APPEARANCES OBSERVED AFTER DEATH.

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READ NOVEMBER 26TH, 1833.

THE cases and dissections I have now the honour to submit to the attention of the Society, appear to possess some features of interest and importance. They do not demonstrate the full extent of the constitutional powers, as occasionally manifested in the production of ossific union; but they may, nevertheless, suggest certain remarks illustrative of this process, which remarks may probably form the subject of some future communication.

No. I.

*Fractured Cervix Femoris; immediate Shortening,
with Eversion of the Limb. Appearances at
three weeks.*

April 23, 1829. I examined the body of M. H.,
aged 76. She had fallen on the trochanter of the

right femur; and from that moment was unable to move or stand.

The day after the accident, I found the right limb an inch and a half shorter than the left, with eversion of the foot. Motion produced great distress. Without much pain or suffering she gradually sunk and died, three weeks after the fall.

On dissection, I found the fracture oblique; above, it passed through the cartilaginous margin of the head of the bone, extending obliquely round, and separating the lower part of the neck three-fourths of an inch below its junction with the head.

The separation of the bone was complete, but the ligamentous investment covering the cervix posteriorly, was entire; at the lower portion of the anterior surface a single fibre of this texture remained, restricting the edges of the fracture to the distance of half an inch. The neck of the femur had lost half an inch of its length, by absorption.

The synovial fluid was deeply tinged with blood, and between the fractured surfaces small masses of coagulated blood were observed, together with a minute detached cancellated fragment of bone. The cartilaginous surfaces of the joint were much discoloured and appeared as if their texture was ecchymosed; these surfaces, soiled with grumous blood, it was necessary to wipe clean, when it was manifest the

cartilage itself was stained of a dull red hue, from blood diffused apparently through its substance. There was no appearance of any attempt towards union.

The preparation demonstrates the capsule much thickened and ecchymosed; and the round ligament of a livid red colour, but so wasted as to be scarcely perceptible.

No. II.

Fractured Cervix Femoris; slight Eversion; no Shortening till six weeks afterward. Appearances at two months.

June 19, 1831. I examined the body of C. D., aged 75, injured by a fall on the right hip, two months before.

On observing the recent state of this accident, both limbs measured the same length, the only peculiarity being a slight eversion of the leg and foot.

The limb admitted of being moved and raised with facility, and without pain or crepitus.

She had fallen with the hip on the edge of a stair, and, attempting to rise, fell a second time, and was then carried helpless to bed.

She suffered little, but latterly the limb became imperceptibly shortened, about an inch.

On dissection, I found the capsule of the right hip much thickened and condensed, especially above the articulation. The fracture passed round the neck of the femur near its head. The posterior half of the ligamentous expansion covering the neck of the bone remained entire, with the exception of two or three small openings. Indeed, the degree of thickening and compactness of texture, in this expansion, forms one of the most interesting characters in this specimen.

Inferiorly, the fracture left the margin of the upper fragment sharp; and the trochanters drawn upwards, as interstitial absorption advanced, the inferior portion of the ligamentous investment had ulcerated; a similar change having exposed what remained of the inferior part of the neck of the femur.

Between the fractured portions, were several light, tender, fibrinous bands, tinged with blood, connecting the cancellous surfaces to each other. The neck of the bone had lost three-fourths of an inch of its length, by absorption. The round ligament entire, was discoloured by blood effused into its interstitial texture; a similar tinge having extended itself into the fatty substance surrounding the attachment of the ligamentum teres at the bottom of the acetabulum; appearances still visible in the preparation.

In the abdomen, the common trunk and internal iliac veins on the left side, were filled with a compact coagulum of blood; the common iliac especially

was so perfectly filled, that it is not easy to understand how, towards the close of life, the blood was returned to the heart; although there had been no oedema of the lower limbs.

The left femoral vein, for some extent, is seen filled with a coagulum of dark blood, the colour above being more florid, and the texture more compact than below. A small coagulum also may be observed in the common trunk of the right iliac vein.

Although these latter changes were the apparent result of inflammation, rendering the colour of the inner surface of the vena cava deep red, there was no material thickening in the coats of the vessel, no visible deposit of fibrine in the cellular tissue, nor any effusion of fibrine or pus into its cavity.

No. III.

Fractured Cervix Femoris; immediate Shortening, with slight Eversion of the Limb. Appearances at five months.

Dec. 5, 1828. E. M., æt. 78, five months before death fell with her right hip on the floor. On the following day, I found that moving the limb gave great pain, but produced no crepitus. Both limbs straight, the right heel lay an inch higher than the left, with slight eversion of the foot. She died from sloughing of the integuments covering the sacrum.

On dissection, I found the fractured head of the femur separated within the capsule, which was thickened, compact, and ecchymosed. The head of the femur, raised from its place, enabled me to perceive that the cartilaginous surfaces were of a dark red colour, but not ulcerated; the round ligament ecchymosed, wasted, and pulpy. The soft matter occupying the cancerous fractured surface of the head, was a grumous granular mass. What yet remained of the fractured neck was undergoing absorption; the surface perforated with numerous foramina; filled with a soft granulated substance, similar to that just mentioned. At one point, the lower margin of the fractured neck was attached, by a fibrinous band, to the corresponding part of the head of the bone, and also to the capsule of the joint.

From the exposed cancellated surface of the cervix femoris, in this specimen, a flat cartilaginous plate is seen standing out in a vertical position; an appearance which, as the cartilages of the joint are still entire, it is difficult to explain.

No. IV.

Fractured Cervix Femoris; with immediate Shortening, and Eversion of the Limb. Appearances at ten months.

Oct. 13, 1832. L. M., æt. 79, fell on her right side. The same evening I found the neck of the

right humerus broken obliquely, and the neck of the right femur also fractured, with the usual symptoms, great pain in the joint, inability to bear motion; with shortening and eversion of the limb.

For this patient little could be done. Her mind imbecile, she forgot or neglected every thing said to her; neither was she disposed to admit of any means being adopted for her relief. She sank and died, August 6, 1833.

On dissection, I found the uniting medium of the fractured humerus so soft as to admit elastic motion.

The capsule of the hip thickened; the fracture had separated the neck irregularly, about half an inch below its junction with the head. There were no fibrous bands to connect the fractured parts together; but the surface of the upper fragment was fairly covered with cartilage, except a small space at its lower part, the size of a split pea, presenting a hard, polished, ivory-like substance.

The ligamentous investment of the upper and back parts of the neck was entire, attaching the head and basis of the neck to each other. The neck of the femur was nearly absorbed; the part remaining being modelled into a little crutch, exactly fitted to receive and support the head, and almost entirely covered with cartilage. At the upper margin of the neck, and beneath the ligamentous investment, was a

small flattened piece of cancellated bone, covered with cartilage, attached to the ligament, yet entering into the moving fabric of the new joint.

The round ligament, pulpy, and discoloured by ecchymosis, (although no fluid tinged with blood was found in the joint,) was attached by both its extremities; yet the cartilages and bone were ulcerating deeply away, by the agency of red fleshy granulations, still visible in the preparation; springing from within the bone surrounding each insertion of the ligament.

No. V.

Fractured Cervix Femoris; no immediate Shortening, slight Eversion of the Limb. Appearance at twenty-two months.

May 5, 1828. E. B., aged 79, fell upon the right trochanter. The same day, I found both limbs the same length. The knee and foot slightly everted; the hip joint with some pain admitting free motion. She could neither stand nor move the limb; complaining of pain in the joint and groin.

It being doubtful whether fracture existed, and there being reason to apprehend interstitial absorption, and progressive shortening might nevertheless result, as in another case *, I determined to try the effect of counter irritation. For this purpose (Aug. 7) a

* See Case No. VII.

small blister was applied, and kept open ; behind the articulation.

Aug. 20. The blister very sore, pain in the joint relieved ; she slept much better than before.

Nov. 4. So much relieved, that the hip was entirely free from pain.

Feb. 28, 1829. The discharge maintained six months, the blister was allowed to heal. The benefit derived being freedom from pain, and improved power of moving, and bearing on the limb. The experiment had failed in its principal purpose, the prevention of shortening, as this change commenced, almost insensibly, during the period of its application ; a change less perceptible than it otherwise might have been, from muscular retraction having drawn the affected limb across the other.

May, 1830. The general health gave way ; she became anasarious, and soon died.

The limbs laid straight ; the right leg and foot, much everted, proved to be three inches shorter than the left. Exposing the capsule, and opening the joint, I found the head of the femur separated from the shaft, by a fracture passing round near the margin of the head. The cancellated surface of the head was at many points covered with minute nodules of fine cartilage.

The neck of the femur was gone ; part of the space between the trochanters being covered with a ligamentous fibrine, the intervals presenting open cancelli, with minute nodules of cartilage, similar to those on the opposite surface of the head. From the upper part of the basis of the neck of the femur, many rounded projections of bone, covered with cartilage, were put forth, over which the thickened capsule moved with facility.

A strong fibrinous band, three-eighths of an inch long, connected the upper margin of the head to the opposite surface of the neck. A second strong band connected the neck of the bone to the capsule, on the upper edge of the acetabulum.

The capsular ligament, on its superior part, was half an inch thick, where its breadth was so diminished as to have brought the margin of the trochanter nearly into contact with the acetabulum. Fibrinous effusion, not confined to the seat of fracture, presented itself on most parts of the synovial membrane : one little mass, attached by a narrow basis to the anterior part of the capsule, was nearly the size of a scarlet bean ; another, entirely detached, in a recess within the joint, had assumed all the characters of a loose cartilage, a fine elastic structure, and smooth surface.

The round ligament, although visible in the preparation, is exceedingly wasted and shrunk.

No. VI.

Fractured Cervix Femoris; immediate Shortening and Eversion of the Limb. Appearances of partial compact Ligamentous Union, at eight years.

July 26, 1828. R. S., aged 70, had fallen, three years before, upon the right hip. With severe pain, total loss of power, and some shortening of the limb, she lay in bed six weeks, and then with crutches began to move about. It subsequently became much shorter, and had "gradually grown shorter of itself." On the approach of cold or wet weather, there was still pain in the bone; and, if leaned upon, it became violently painful in the joint, and parts around.

I found the right limb two inches shortened, with trifling eversion. Abduction gave great pain. A smart blow on the bottom of the heel did the same thing; and the pain in the bone became equally acute on making a gradual but firm pressure in the same direction.

In walking, she supported herself entirely on her crutches, scarcely touching the ground with the toe of the injured limb.

She was desired to keep her bed; and a small blister, applied behind the trochanter, was kept open many months; from this she found relief. A few

days after it was laid on, the blister sore, the pain within was much less. She slept much better than before.

January 20, 1829. The blister was healed ; the joint feeble and weak. She remained perfectly easy.

July 15, 1831. The hip joint, from weakness, was still incapable of supporting the least weight. Considering the extreme deficiency of strength in the articulation, I determined to try the effect of keeping the fractured surfaces in contact for a time ; and had her therefore placed on the double inclined plane.

August 6. The confinement proved so irksome, that in three weeks, yielding to her urgent entreaty, I directed her to be removed to a common bed, and soon allowed her to use crutches.

September 10. I met this woman walking without crutches. She had a little stick, and said her right hip was now nearly as strong as ever ; she felt no pain in leaning upon or even striking it with her hand, which was not so before being placed upon the bed.

May, 1833. Informed of her decline and death, I did not fail to remove the joint. The fractured surfaces were connected by an unusually strong ligamentous adhesion, to demonstrate which required

the cutting away of nearly the whole capsule. The fracture had followed the line of the margin of the head of the femur, the neck being nearly absorbed. Anteriorly, a line or web of strong, short, fibrinous bands is seen, connecting the head of the femur, and upper part of the acetabulum, to the basis of the neck; these attachments extending from the upper to the lower margin of the acetabulum. Posteriorly, the fractured surfaces are seen attached by one thin band of fibrine only.

Inferiorly, the capsule, at one point, may be observed to be united by adhesion to the margin of the head of the bone.

No. VII.

Fractured Cervix Femoris; slight Eversion, no immediate Shortening of the Limb. Appearances at fourteen years.

January, 1828. I visited S. M., a healthy woman, aged 62. Twelve years before, descending the ladder of a waggon, she fell, with the left hip on the stones. Entirely helpless, she was carried into an infirmary, where both limbs, being found of the same length, the injury was said to be only a severe bruise. In three months she walked well, without a stick.

This woman, in strong and active health, was equal to every laborious occupation. Her gait was rather awkward, her left leg being two inches

shorter than the right ; but she never felt either pain or weakness. I found the motions of the hip ample and free, with trifling eversion of the leg and foot.

February, 1830. Informed of this person's death, the parts were, at my desire, removed. I laid open the joint by an anterior crucial incision, exposing the synovial cavity. The line of fracture was about an inch from the margin of the head. The part of the neck remaining between the trochanters was so nearly absorbed as to have left only a gentle elevation towards the middle of the space, answering to a depression on the opposite surface. Both surfaces were covered with a copious secretion of cartilage, on some parts deposited in flattened nodules, on others presenting an even surface.

The capsule was condensed, as usual. In the substance of the capsule, above, a large bursa had formed, between the margin of the trochanter and edge of the acetabulum. There was a free effusion of fibrine into the joint ; and the head of the bone was so closely adherent to the capsule, as to prevent its being raised from the acetabulum, to ascertain the state, or indeed the existence, of the round ligament.

There were no fibrinous bands connecting the fractured surfaces ; the only attachments of that kind were those just mentioned, the apparent object of which was, to steady the head and neck of the

bone, in a particular position, and give freedom and facility of motion to the new joint.

It is evident, in this case, that when the weight of the body, in walking, was placed on the limb, the action between the femur and pelvis was amply provided for, in the new articulation; although the principal support was derived from the great strength of the capsule.

No. VIII.

Fractured Cervix Femoris; immediate Shortening and Eversion of the Limb. Appearances of compact Ligamentous Union, at five months.

July 1, 1829. M. C., aged 66, fell over the kirkstone, on the right hip, fracturing the neck of the femur. I found the limb shortened two inches and a half; the foot everted.

September 19. She was laid on the double-inclined plane, but in a fortnight became urgently impatient to be set at liberty, and so infirm that the nurses could scarcely keep her clean. For these reasons the experiment, promising nothing, was given up, and she was removed to a common bed, where she gradually sunk, and died November 22.

On dissection, the only evident source of irritation

was in the gall-bladder, which was nearly filled by a collection of small dark-green biliary calculi.

In the hip joint the neck of the femur appeared very much shortened, but not disunited from the head, which remained perfect, and covered with a thickened capsule. The capsule opened; the head of the bone was gently raised from the acetabulum. The round ligament was so wasted as to have become entirely disunited, at its insertion upon the femur. Some shreds of its substance still remained attached at the bottom of the acetabulum, and are still visible in the preparation; but in the depression upon the head of the femur, no trace remains.

It appears that when fractured the head of the femur had been separated high up, and the neck of the bone subsequently absorbed. The head of the femur was no longer separated; for the neck removed by absorption, and the parts steadily retained in apposition, the head of the bone had settled itself so firmly into the space between the trochanters, that it appeared, at first sight, a specimen of ossific union.

To ascertain the precise state of the uniting medium, I divided the head and shaft longitudinally with a saw, in which operation the attachment of the parts suffered no apparent disturbance.

The section of this specimen in the preparation,

presents a perfect example of compact ligamentous union. The fractured surface of the head, and basis of the neck, are seen so closely in contact as to exhibit only an interposed lamina, scarcely thicker than paste-board, of compact ligamentous substance.

No. IX.

Fractured Cervix Femoris. Immediate Shortening; at first slight Inversion, subsequently Eversion of the Limb.

January 28, 1833. E. B., aged 79, fell upon the left trochanter: totally helpless. She was unable to get up, or stand, move the limb, or allow it to be moved. I found her the next morning in great pain, the limb three inches shortened, the toes inclined, at first inward, subsequently outwards.

February 2. She was laid on the inclined plane. At first the limb was obstinately rigid, and retracted, but the next day the tired muscles relaxed, the hip became easier. During her confinement, the repose and apposition remained perfect. She latterly complained of her loins and back.

March 23. Having remained forty-nine days on the inclined plane, she was lifted off to a common bed, and laid on her right side. The change of position, and comparative freedom, added much to her comfort.

March 28. The hip joint was cautiously moved, and progressively examined ; and it appeared that the fracture was well united. The muscles of the thigh were stiff and painful, when moved ; but without the least pain in the hip. On taking hold of the trochanter, behind and before, and pressing it forwards and backwards, it felt as if firmly united to the head of the bone.

May 10. Daily attempts had improved the power of moving about, without inducing pain in the hip-joint. She could now place nearly the whole weight of the body on the left foot.

August 13. From irritable bowels, her strength had sunk considerably ; she was unable to leave her bed : but both limbs were equally weak and reduced. The left leg and thigh, at this time measured, was nearly an inch shorter than the right. This woman, somewhat improving in health, subsequently left the house.

Saville Row,
Sept. 9th, 1833.