

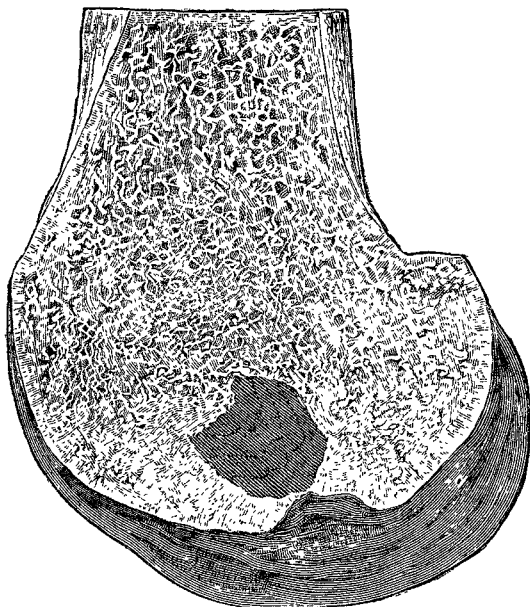
TWO CASES OF GUNSHOT INJURY IN THE NEIGHBOUR- HOOD OF THE KNEE-JOINT,

WITH LODGMENT OF THE PROJECTILE IN THE CONDYLES
OF THE FEMUR.

By SIR WILLIAM MAC CORMAC.

THE interesting case reported by Dr. MacGillivray in THE LANCET of December 12th, 1885, where he successfully removed half an Enfield bullet which had remained lodged in the internal condyle of the femur for thirty years, and Professor Longmore's valuable comments thereon in THE LANCET of January 2nd, 1886, induce me to publish notes of two cases recently under my care, in each of which a bullet had remained for some time lodged in the condyles of the femur. Dr. MacGillivray's case illustrates the fact that a bullet lodged in bone is apt to produce mischief sooner or later, and that after even protracted intervals of quiescence inflammation recurs, abscess forms around the bullet, and adjacent structures may become seriously implicated. This happened notably in one instance under my own observation, where a man who had been shot in the

FIG. 1.



Section of femur, showing a bullet which had lodged in the condyles for fifteen years.

sacrum during the first New Zealand war suffered at intervals great pain and distress from abscess and exfoliation of bone. The bullet could not be felt at the time, and it was not till an interval of thirty years had elapsed that the ball was discovered and extracted, the patient subsequently making an excellent recovery. This course I believe to be the rule in such cases; but the converse may occur, and of this a typical instance is recorded in the third volume of the "Surgical History of the War of the Rebellion," p. 372. Lieutenant Blake, aged twenty-five years, was wounded at Antietam in 1861, while kneeling to stop bleeding from a comrade, by a shot which, after traversing the elbow, entered the outer side of the left knee-joint. On examination the probe is stated to have freely entered the cavity of the joint, but no bullet could be found. He was sent to Boston, where he came under the care of Dr. Mason Warren. Both the knee and elbow-joints did perfectly well, and after two months the patient could get about. He recovered the movement of both joints, and could walk without any sign of lameness, the ball still remaining in the knee. He continued actively engaged in his business, suffering no kind of inconvenience until fifteen years later, when he was attacked with pneumonia, of which he died, the bullet having remained harmlessly in the outer condyle all this time. A necropsy was made, and I saw the specimen thus obtained in the Army Medical Museum at Washington. It is a most curious one. The ball is seen in the section completely fixed in the bone, without a trace of inflammatory disturbance about it.

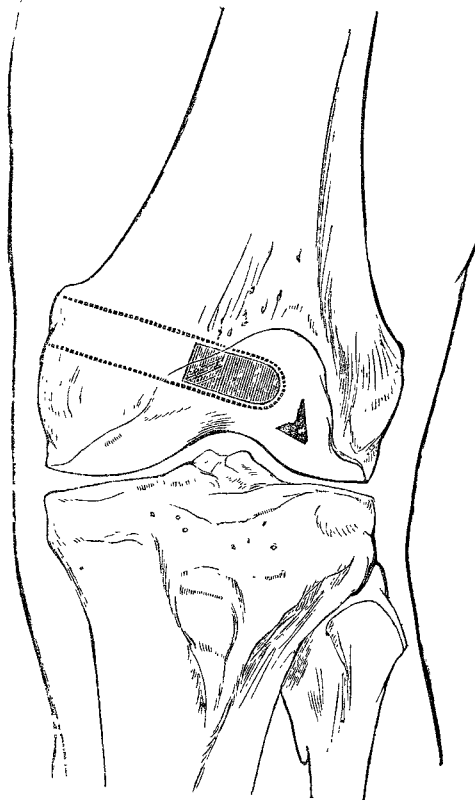
The bone is everywhere in direct contact with the bullet. There is no layer of granulation tissue or cavity. The articular cartilage covering the end of the femur is quite smooth and unchanged, except just over the bullet, where there is a cicatricial depression. At this point the bullet is not more than a line distant from the surface. (Fig. 1.)

The notes of the two cases following were taken by Mr. H. Duncan and Mr. E. Solly, and to the latter I am indebted for the admirable drawings showing the position of the bullet in each case, as well as for the drawings of the bullets themselves.

CASE 1. Gunshot-wound of the condyles of the left femur.—

Arthur A—, aged thirty, an ex-officer in the French army, was admitted into St. Thomas's Hospital on June 4th, 1885, and discharged on June 26th. On Dec. 23rd, 1884, the patient received a bullet-wound from a Martini-Henry rifle on the inner side of the left thigh, just above the knee. He says it was fired from a distance of about eighty or ninety yards. He was out, he told us, with a French comrade on a hunting expedition in Senegal, on the West Coast of Africa, collecting wild animals to send to Europe for the Zoological Gardens. On one occasion they came unawares upon a lion, and the Frenchman, it seems, fired too soon from excitement, and shot A. A—, instead of the lion. He felt a "dull thud" on the inner side of the knee; blood escaped freely, which he tried to staunch, while his black servants went for help.

FIG. 2.



Lower end of left femur. The length and direction of the bullet track and the position of the bullet are indicated.

A doctor arrived, who, after probing the wound, declared the bullet must have fallen out, and the next day after the accident he was carried to the French military hospital at St. Louis, on the coast, and remained there from Dec. 24th, 1884, to May 4th, 1885. While in the hospital the knee became much swollen, he suffered great pain in it, and had several attacks of fever, the temperature rising, he stated, to 105°. A wire splint was applied. The wound continued to discharge freely. The knee became flexed and fixed, and continued very painful and swollen. From all this the joint would certainly appear to have been implicated. The wound was many times probed, and an exploratory incision was also made, but the bullet could never be detected, the surgeons declaring there was no bullet in the limb. Finally, the man was told that in order to save his life it would be necessary to amputate the limb. Fearing to have it done on the spot, he decided, contrary to the advice of the doctors, to sail for home, and came over to England in May, being admitted into St. Thomass Hospital on June 4th. During the voyage home he greatly improved in general health.

On admission, a sinus was found opening just above the

internal condyle of the left femur, a probe, passed about two inches downwards and outwards across the condyles, tending towards the cavity of the knee-joint. The knee was quite stiff, and the parts around it swollen. He did not complain of pain, except on movement. In accordance with what he had been told when he left the African coast, he came to the hospital fully prepared to have his thigh amputated. I probed the sinus, and detected a body which I believed to be the bullet. (Fig. 2.) A Nélaton's porcelain probe was then passed in, and on withdrawal was found to be distinctly marked with lead.

June 6th.—Ether was administered, and, an Esmarch bandage having been applied, a director was passed into the sinus and an incision made down to the bone, the opening in which was sufficiently enlarged with the mallet and chisel. After some difficulty the bullet was then seized with a pair of toothed bullet forceps and extracted. A drainage-tube was inserted, and the wound, having been washed out, was dressed antiseptically with iodoform gauze. The dressings were applied before the compression was taken off, and on removal of the Esmarch tourniquet a considerable amount of bleeding took place, which soaked through the dressings and necessitated the opening up of the wound, which was then packed and fresh dressings applied. The limb was put up in a long outside splint, a MacIntyre not having been got ready. The bullet, of which a drawing is given (Fig. 3), weighed 194 gr., was about $\frac{1}{4}$ in. long and $\frac{1}{8}$ in. in diameter. It presents longitudinal striæ, such as might be caused by its passage down a rifle-barrel, but is otherwise comparatively little changed in shape. It is not nearly so large as the ordinary bullet for a Martini-Henry rifle. In Fig. 4 the bullet extracted in the second

could be felt, and neither pieces of clothing nor the bullet were discovered. The limb was placed in a splint, and dressed daily with carbolised oil and lint. The temperature was only once taken after the accident, when it was 101° . Two or three days afterwards the knee became swollen and very painful. The discharge was described as at first thin and red, subsequently it became whitish yellow. The patient was after a time conveyed to Cape Town, where he arrived on Oct. 3rd, and the next day he sailed for England, which he reached on Oct. 28th.

He was admitted into St. Thomas's Home on October 31st, and was next day examined by me. There was a sinus over the right internal condyle, discharging a small quantity of thin pus. The probe could be passed almost directly outwards, with a slightly downward direction, for nearly three

FIG. 3.



FIG. 4.

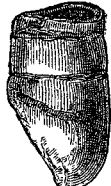


FIG. 5.



Bullets removed in the cases of A. A.— and R. L.—, together with a similar ball from an unexploded cartridge.

case, very much resembling that from the first, is represented; and in Fig. 5 a similar ball from an unused cartridge.

7th.—Patient very comfortable. The long outside splint changed for a MacIntyre. From this date he progressed perfectly favourably till June 24th, when he was discharged with a small sinus, still unclosed, in the track of the bullet. Passive movements had been resorted to and the motion of the joint gradually improved. On his discharge he could flex it nearly to a right angle.

Arthur A.— was again admitted for a short time on Oct. 3rd. The sinus in the track of the bullet persisted. This was opened up, but no dead bone discovered, and the patient was again discharged on Nov. 17th, the sinus being then almost closed. On the 12th of January last I had an opportunity of again seeing my former patient. The movements of the joint were practically perfect, the sinus was closed, he suffered no pain or inconvenience, and could walk long distances without fatigue. He was, in short, perfectly well; he had married since he left the hospital, and intended to sail for Australia the following day.

CASE 2. *Gunshot wound of the condyles of the right femur.*—R. L.—, aged twenty-five, a brother of one of my dressers, served as a gentleman trooper in Methuen's Horse during the late Bechuanaland expedition. On the afternoon of Sept. 11th, 1885, while sitting in his tent at dinner, with a mess-tin between his knees, a service revolver was accidentally discharged at a distance of about four or five feet. The bullet, weighing 240 grs., and measuring $\frac{3}{4}$ in. by $\frac{1}{8}$ in., having previously traversed the mess-tin, entered just above the right knee on the inner side, close to the adductor tubercle, and passed almost directly outwards. (See Figs. 6 and 7.) The patient was conveyed four or five miles in a "mealy" waggon to the hospital, keeping his knee flexed in the same position as at the time of the accident. He describes the pain felt at the moment of injury as resembling that which would be caused by a blow on the knee from a mallet. The amount of blood lost at the time or subsequently was but slight. On examination, however, soon after, by a surgeon, no foreign body

FIG. 6.

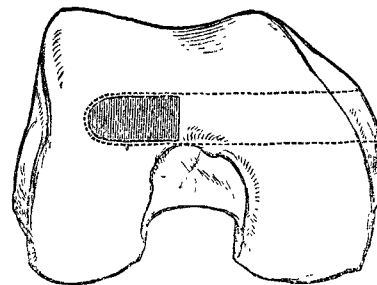
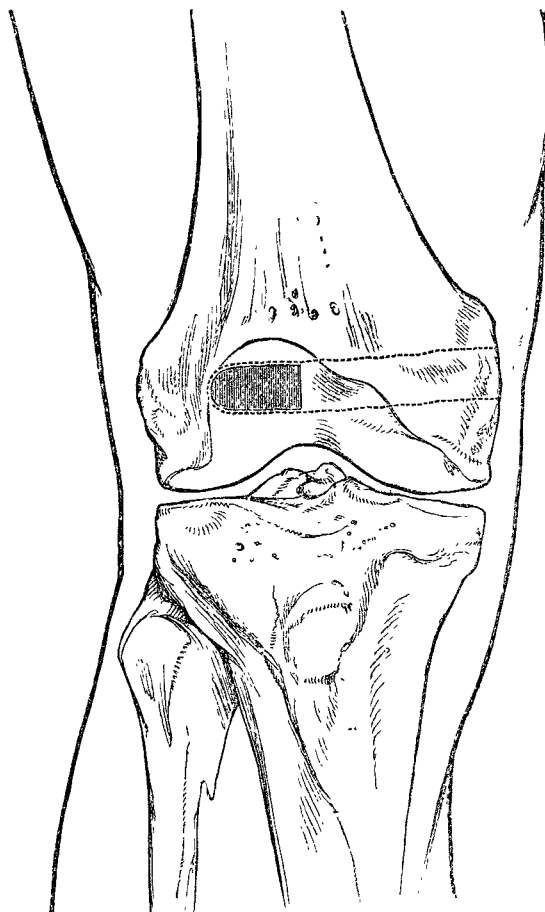


FIG. 7.



Lower end of the right femur, showing the position and direction of the bullet track in Case 2. (Half the natural size.)

inches. At the bottom the dull sensation of striking a bullet could be felt, and on introducing a Nélaton's probe the porcelain came out distinctly marked with the lead stain. There could be no doubt that the projectile was lodged in the external condyle of the femur, very close to its articular surface. The patella was movable, but the knee was painful, could only be very slightly bent, and the soft parts around the joint were infiltrated.

Nov. 2nd.—Ether having been administered and Esmarch's apparatus applied, I again introduced into the sinus a Nélaton's probe, and the porcelain on withdrawal was plainly seen to be streaked with lead. A vertical incision was then made over the posterior and inner aspect of the condyle for about $2\frac{1}{4}$ in., having the wound in its centre, and extending down to the bone. From this the soft parts and periosteum

were detached for about an inch around the opening made by the ball, which was then enlarged by the chisel and some pieces of bone removed. The projectile was now found firmly fixed in the cancellous tissue. By means of a pair of toothed forceps the bullet was speedily seized and withdrawn. A probe could now be passed into the interior of the bone for a distance of exactly $2\frac{1}{2}$ in. from its surface, and the extremity must have reached nearly to the external aspect of the external condyle, while the bullet track could certainly not have been, at all events in some parts of its course, more than a quarter of an inch distant from the articular surface of the end of the femur. A double drainage-tube having been introduced, the wound was syringed out with carbolic acid solution of a strength of 1 in 40. The edges of the divided tissues were brought together by silk sutures, and the wound dressed with iodoform gauze and salicylic wool. A narrow wooden splint curved to the shape of the limb was applied posteriorly, and strips of Bavarian flannel soaked in plaster-of-Paris were applied anteriorly and laterally, the limb being bandaged to the splint from the foot to about half-way up the thigh.

3rd.—The patient has had a good night. Last evening's temperature was $100^{\circ}8'$, and this morning it is $100^{\circ}4'$. A slight oozing came through last night and a fresh dressing was applied.

4th.—Temperature last night $100^{\circ}8'$; this morning $99^{\circ}6'$. Wound dressed. It is looking healthy. New plaster-of-Paris splints were applied, and the wooden one was removed.

11th.—Temperature last night $100^{\circ}2'$; this morning 99° .

During the next week the patient did not complain of any pain, and he felt quite well. The temperature was normal. The stitches were removed on the 8th, when the wound was found to be united except in the position of the former sinus. The drainage-tube was gradually shortened as the bullet-track became filled with granulations. The patient got up on the 16th. From first to last he had little or no inconvenience. The joint under the influence of passive movements was becoming less swollen and supple, and he left for home on Nov. 28th, able to walk a long distance without the least difficulty. The sinus was quite superficial, and on the point of closing. In a letter from Mr. L—, dated Jan. 14th, 1886, he says: "I can do as much walking and riding now as I ever did, and bend my right leg as far as the other." The bullet, of which a drawing is given in Fig. 4, was flattened somewhat at its extremity; it weighed 340 grains. A similar bullet, weighing 245 grains, is shown in Fig. 5, taken from an unexploded cartridge.

Remarks.—The two cases recorded are striking from the similarity of the injury in each. The bullets causing the damage were almost alike in size, although one was discharged from a rifle and the other at close quarters from a pistol. The ball traversed the expanded portion of the condyles transversely in both cases from within outwards, in each instance very near to the articular surface, lodging in the bone in both, and in both remaining undiscovered for a considerable time. In both, too, there were symptoms of inflammation in the knee-joint, some pain, fever, swelling, and subsequent stiffness, which passed off. It is difficult to believe that in either the injury could have been wholly extra-articular. Conical bullets such as these, and capable of penetrating the bone to so considerable a depth, would be very likely to cause fissures which would almost certainly extend to the joint surface, while the continued presence of the foreign body could scarcely fail, one would suppose, to excite articular mischief. Nevertheless, in neither of these two cases has any permanent ill result followed, and the function of the joint is in both perfectly restored. There is a strong presumption, without, I admit, any positive proof, that the knee-joint was implicated to a greater or less degree in each of these cases, yet recovery has ensued with a freely movable articulation, and certainly without in either case any special advantage in regard to treatment. Perhaps, after all, a gunshot injury of the knee may not be always so disastrous as it was at one time assumed to be. Langenbeck told me he had met with at least one hundred cases of penetrating wound of the knee-joint followed by recovery during the Franco-German war. Many cases of recovery after a bullet had traversed the joint and fractured the bones are recorded by the Surgeon-General of the United States army; and then there are the remarkable results published by Bergmann and Reyher obtained after antiseptic occlusion in the Russo-Turkish and other campaigns. During the American war 338 cases of unmistakable frac-

ture involving the bones of the knee-joint made good recoveries after an altogether expectant plan of treatment—that is, both life and limb were preserved. Many of the cases besides the one which I have first quoted, are most remarkable, but for the details I must refer to the Surgeon-General's report. A conservative treatment, whenever it is possible to adopt it, is probably by far the most promising one for gunshot injury of the knee-joint, and it has proved the most successful, especially in recent campaigns. Excision of the knee for gunshot injury in time of war has hitherto been disastrous, while amputation has been very fatal also.

SYMMETRICAL SYNOVITIS OF THE KNEE IN HEREDITARY SYPHILIS.

By H. H. CLUTTON,

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THE fact that the condition of which the title of this paper gives the most prominent feature has been little noticed in our surgical literature tempts me to make a few remarks as to its clinical features. I have myself but little doubt that it is due to hereditary syphilis, for the subjects of this symmetrical synovitis who have come under my observation have always given other evidence, either past or present, of the disease. My own cases, of which the notes have been carefully kept, are seven in number. Mr. Nettleship, who has also taken a great interest in these cases, has kindly given me the notes of three others, which I have myself seen at the time they were under observation in the eye department at St. Thomas's Hospital. Mr. Lawford has also supplied me with another case during the last six months, which brings the total to eleven. I have, I am sure, seen many more of which I can find no accurate record; and I well remember, some years ago, soon after I began to take an interest in this subject, that Dr. Greenfield, who was then my colleague, drew my attention to several cases which had occurred in his practice. It must be remembered that my own cases were all out-patients, one or two only being admitted for a time to test the efficacy of splints and rest. The difficulty of keeping any notes in the out-patient room must be my excuse for this deficiency. The disease is, I am sure, a rare one, so that only a few cases will come under the observation of any one surgeon; for since my attention has been directed to this condition I have been on the look out for such patients, and have only met with quite a small number.

The average age of the patients recorded in the accompanying table was about thirteen, but they were mostly between the ages of eight and fifteen. The predominant features of the disease were the symmetry of the affection, the freedom from pain, the long duration of the symptoms, and the free mobility of the joints on passive movement throughout the course of the disease. Its symmetrical character first led me to look for a constitutional cause, and there was no difficulty in seeing that the patients were the subjects of hereditary syphilis. I do not mean to say that no other constitutional diseases could possibly have produced such a symmetrical condition, but I do think that other joints besides the knees would probably have been at some time and in some of the cases affected in a similar manner if such diseases as rheumatism, gonorrhœa, or gout had been the cause. I have never seen both knee-joints fill with fluid, causing scarcely any pain or discomfort, whilst other joints remain quite free from any signs of inflammation, except in cases where there was distinct evidence, either past or present, of hereditary syphilis. The patient generally complains of stiffness in one knee, which is then found full of fluid, but not tense: on careful examination the other knee is also found to contain fluid, but not to the same extent as the one for which advice is sought. So that it is fair to assume that the knee to which attention has been directed by the patient has been affected some little time before he has felt any inconvenience. In a few instances there has been an interval of some months before the second knee has given the ordinary signs of synovitis; and in one case (No. 5 in table), which was that of the patient aged twenty, there was an interval of two years. All the other joints have been at the same time carefully examined, to make