

**On the nature and treatment of some painful affections of bone / by
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ON THE NATURE AND TREATMENT
OF SOME
PAINFUL AFFECTIONS OF BONE.

THERE are many affections of bones, whose predominant character is pain, which are hardly to be referred to any of the more well known diseases of these parts, and which certainly are not ameliorated by the means generally resorted to for their cure or relief. The more common affections of bone, marked by severe pain, are inflammations of the periosteum; of the medullary membrane of the shafts of the long bones; of the bony tissue itself; circumscribed or diffused abscess of bone, and neuralgia. All these varied affections are accompanied by intense pain; in fact, pain appears to be the chief symptom of the disease, and in many instances is so great as to threaten the death of the patient, if not relieved even by so extreme a measure as the amputation of a limb.

The differential diagnosis between some of these affections is, in many cases, obscure, and even the

most experienced surgeons have often found it difficult to decide on the exact source or nature of the pain which has had its seat in a diseased bone.

It has appeared to me that many of these painful affections of bone are of inflammatory origin, and that the inflammation is seated in the medullary membrane of the shaft, or that which lines, imperfectly, the cancelli and canals of the extremities of long bones.

The chief anatomical characters of the medullary membrane of the long bones are extreme tenuity, great vascularity, and excessive sensibility. In many characters it differs essentially from the periosteum, which is neither so thin, so sensible, or so vascular. It is through the medium of the medullary membrane, which is supplied in each long bone with its special artery, that the whole of the internal structures of the bone are nourished and supported; and hence it is that death of the bone follows the destruction of the medullary membrane as the experiments of Troja have already proved; and it is equally probable that necrosis of portions of the shafts of the long bones may follow a partial destruction of the medullary membrane from inflammation.

I have just stated that the medullary membrane is very vascular, so much so that it frequently forms a species of hernia from the medullary canal of a long

bone in young persons after amputation, this protrusion is the medullary membrane turgid with blood.

It is also common to see the blood issue in a stream from the divided vessels of the medullary canal after an amputation, particularly if the amputation be performed high up, either in the arm, thigh, or leg. There is no question about the source of this blood, it is from the vessels of the medullary membrane. The medullary membrane, highly vascular, serves to nourish the internal layers of the bone, it possesses great sensibility and a high degree of vitality. The medulla, or fatty tissue of the medullary canal, is altogether insensible. It has been shown by vivisectors, that if a probe be introduced into the centre of the medulla of a long bone in a living animal, no sign of pain is produced as long as the instrument does not touch the walls of the cavity, but whenever the walls are rubbed or scratched, the pain becomes excessive, and is manifested by piercing cries or violent struggles.

A membrane so extended in its ramification, so sensible, so vascular, must necessarily be the common seat of disease; and when we reflect that this membrane is enclosed in an unyielding bony case, it is quite evident that many of its diseases must be accompanied by extreme pain.

In the spring of 1847, Jane Hartshorn, a female of stout, healthy appearance, was admitted into the Queen's Hospital under my care, suffering from pain in the shaft of the left tibia, which she said had originated from a fall on the knee of that side some months previously, by which the patella was much injured but not fractured. It was considered by the surgeon who attended her in the country, that an abscess had formed over the patella as a consequence of this injury, and an incision was made by him down to the bone, but without the discharge of any matter. From this period she dated the commencement of pain in the leg. At the time of her admission there was severe and constant pain down the whole shaft of the bone, which did not appear to be enlarged, but was tender when it was handled or pressed. A great number of remedies had been tried before she entered the hospital without any relief; and after that time the means resorted to failed in ameliorating the patient's condition; even the complete division of the periosteum, from the knee to the ankle, failed in giving more than a temporary cessation from pain. She remained in the hospital for nearly four months, and left it because at that time I refused to amputate the limb.

A residence in the country and attention to her

general health did not in any measure tend to mitigate the pain, which continued to deprive her of appetite and rest; her health began to suffer, she emaciated, perspired at night, and her constitution exhibited symptoms of giving way. A surgeon in the country proposed amputation, and she was actually on the table, preparatory to the amputation being performed, but preferring to lose her limb in the hospital, she came back, and I at length consented to remove the limb, which was amputated in the lower third of the thigh. An unusual quantity of dark coloured blood flowed in a stream from the medullary canal of the femur when sawn through; and the cavity when this had ceased, was completely filled with dark coloured coagula. The medullary canal of the tibia was carefully examined throughout; the periosteum was not so firmly adherent to the external surface of the bone as in a bone quite healthy. There was no medulla in the canal, which was quite full of dark, grumous blood, and the membrane universally dark throughout. Mr. Stanley* quotes a case from the *Journal Hebdomadaire*, where a very similar pathological condition of the medullary membrane was present. "It was of a deep red colour, resembling the conjunctiva of the eye in chemosis; and in places it was black, with a

* Diseases of the Bones, p. 49.

gangrenous odour." Portal says, "The contents of the medullary cavities may be reduced to a species of putrilage, as a consequence of inflammation; which has been proved by the examinations after death, of bones which have been the seat of severe and continued pains." Hartshorn's stump healed well; and the patient, who had before the operation some threatening of pain in the femur, similar to that which had existed previously in the tibia, continued free from pain till six or seven weeks after the stump had quite healed. Pain then came on in the thigh, and extended to the hip, at first slight, and in the lower part of the bone merely, afterwards becoming more severe, till, as in the first instance, appetite and sleep were lost, the patient began to fall away, and the general health to suffer so much, that it was evident to all some decided course must be adopted to save her life.

It was clear that all ordinary measures would be of no avail in such a case, though many were tried, without success, as might be supposed. The question of a second amputation was entertained: but here it appeared, that unless performed at the hip, we might have again the same condition returning as after the first operation. It occurred to me, after reflecting on Sir B. Brodie's operation for the dis-

charge of pus confined in the interior of bones, that if a piece were cut out of the femur, and a seton passed through it, that the patient might possibly be relieved, if not cured, without subjecting her to further mutilation, involving the risk of her life. A proceeding of this kind offered some chance of success, from the fact that she had no pain as long as there was discharge from the stump, but when the stump closed, the pain again came on.

Sir B. Brodie records a case which first induced me to think the operation I have mentioned would be of service to my patient, Hartshorn: "A young gentleman," says Sir Benjamin, "was brought to me from Brixton, with violent pain in one arm, the bone itself being enlarged in the part to which the pain was referred. The pain continued, and an abscess was suspected. Under this impression, an opening was made with the trephine so that the matter might be discharged, if there were any there. The trephine penetrated to the centre of the bone, but no matter escaped. I persevered," continues Sir Benjamin, "but still there was no matter; and at last the instrument penetrated completely from one side of the bone to the other." Sir Benjamin thought he had made a blunder, and there being no matter, the operation would not

be attended with any benefit; the wound, however, healed well, and the relief to pain was complete.

It was exceedingly probable, that in Hartshorn's case the state of the femur was like that of the tibia, from what was observed of the condition of the medullary canal at the time of the operation. There was some pain in the thigh before this, but the loss of blood at that time, and the discharge from the stump after, kept down for the time the inflamed or congested state of the medullary membrane.

Having determined to perforate the femur, and pass a seton through it to prevent the cavity being too soon closed by callus, I had a trephine prepared with a long, narrow crown, sufficiently long to pass through the bone. While the patient was under the influence of chloroform, I made an incision, about two inches and a half long, in the inner side of the limb, about four inches above the extremity of the stump, divided the periosteum, and perforated the femur with the trephine; I then passed a long, narrow seton needle, made for the purpose and armed with a thick web of cotton, through the hole in the femur, and brought it out on the outside of the thigh.

There was a great discharge of black blood from the medullary canal of the femur when it was opened by the trephine, which gave relief to pain; and after

the discharge produced by the introduction of the seton (which was profuse) was fully established, the pain in the bone, which had so long tormented her, was no longer felt. The seton was suffered to remain through the femur about three months, when it was withdrawn, and the wound suffered to heal. Since that time the patient has remained in good health, and there has been no return of pain in the bone. I have already alluded to the case recorded by Sir B. Brodie, in which he perforated the humerus for pain in the arm, no matter was discharged, but the operation succeeded in curing the pain.* It is exceedingly probable that this case also was an affection of the medullary membrane, probably of an inflammatory character, which had been cured by the division of the distended and overcharged vessels in the interior of the bone.

In the year 1848 a young female, named Chatwin, was admitted into the Queen's Hospital, under my care, for a painful affection of the tibia of the right leg. She was of delicate appearance, by occupation a house-maid, and entirely free, as was the last patient, from all venereal taint. Some time before her admission, she had felt shooting pains down the whole shaft of the tibia, which gradually

* *Pathological Researches*, p. 410.

increased in intensity till she could no longer bear the weight of the body upon the leg. The shaft of the bone was exceedingly tender to the touch, but not enlarged, nodulated, or uneven; the pains were rather in the shaft than in the extremities of the bone: in fact, the greatest pain was felt in the centre. Blisters, opiates, iron, the iodide of potass, and mercury, pushed to salivation, were absolutely useless, and did not procure even a temporary alleviation of pain. It was quite evident, that whatever the nature of the disease might be, that it was seated in the interior of the bone. After waiting a reasonable period of time to see the effects of the remedies employed, and finding my patient's health breaking, I determined to pass, as in the last case, a seton through the centre of the tibia, as this appeared the only means of saving the limb and life of the patient. The integument and periosteum were divided in the centre of the inner surface of the shaft of the bone and the bone perforated, so that the trephine came out on the external surface of the bone. The needle, armed as in the last instance, was passed through the bone and soft parts covering the external surface. The pain caused by the operation was considerable for a few days, but the pain for which the operation was undertaken soon diminished, and at the end of ten days had

entirely disappeared. If the seton were left unmoved for two or three days, there was a difficulty in moving it, owing to the firm deposition of callus around it; and on its final withdrawal, at the end of six weeks, the perforation was very soon closed by new bone.

It is most probable that operations for the relief of certain diseased conditions of the medullary membrane would be rendered in many instances abortive unless the opening in the bone were kept open, by seton or tent of some kind, and daily watched, as the closing of the opening by new bone is exceedingly rapid. Provisional callus is almost immediately thrown out after the perforation of a long bone by the trephine.*

It is quite evident, from the details of these two cases, that the shafts or extremities of the long bones may be opened with success for the purpose of relieving diseased conditions of their interior, besides those which are marked by the formation of matter. It may be asked, what are the symptoms of disease by which such a proceeding is indicated. I should say, fixed and continued pain in a bone, with or without

* See Bèclard *On the Formation of Callus*. Propositions sur quelques points de médecine; Thèse, Paris, 1813. Also Bonn: Thesaurus ossium morbosorum. The observations of these authors were published before the researches of Dupuytren on the same subject. Leçons orales de Clinique Chirurgicale; art. Formation du Cal.: tome iv, p. 70. Brussels edition.

enlargement of its shaft, of sufficient violence to threaten the destruction of the health and life of the patient, and the failure of other remedies adopted for its relief. In many cases, amputation has been resorted to as the only resource in such cases, but I am fully persuaded that the perforation of the bone, and passing a seton through it, will save many a limb which otherwise must have been lost.

Many, if not most, of these cases are doubtless congested or inflammatory condition of the medullary membrane of the interior of the long bones. In some instances such diseases may exist with affections of the periosteum ; in others they may be present alone. It is probable that, in venereal diseases, many of the pains in the shafts of the tibia and other bones are due to disease of the medullary membrane, in the absence of all evidence of the periosteum being affected. Astruc and others, it is well known, attributed such pains to affections of the medulla itself ; but it is now well established that adipose tissue, wherever met with, is insensible ; and the experiments of Bichat and others have shown the seat of sensibility in the interior of the long bones to be in the medullary membrane, and not in the medulla itself. Scrofula, syphilis, rheumatism, and local injury are the most frequent causes of inflammation of the medullary

membrane, and are amongst the most frequent causes to which painful affections of the bones can be traced.

I have performed a similar operation, for a painful disease of the tibia, which was of venereal origin, in August of last year, on a girl named Eliza Cooper, but in this case the medullary cavity was opened only. I did not carry the trephine through the bone. The hole made by the trephine was kept open by a tent of lint, changed every morning. The relief to pain was complete; whilst previous to this operation it had resisted all the usual remedies in such states, as blisters, opiates, iodide of potass, &c., and had at times been so excessive that she had frequently importuned me to amputate the limb.

I have now performed the operation I have just alluded to, in six different cases for painful affections of the long bones, which have resisted all other modes of treatment, and in each instance with success. No constitutional disturbance of any importance has followed any of the operations. In Chatwin's case the pain consequent upon the perforation of the bone was severe for some days, but this was much more bearable than the pain for which the operation was performed. It subsided at the end of that period, and the patient has since enjoyed the best health. I have seen her two or three times since. She has

resumed her occupation as a domestic servant, and suffers nothing from her leg: she walks well on it, and is in good health.

I think, from what I have said, it may be concluded that the shafts of long bones may be perforated or opened for diseased condition of their interior, similar to those I have mentioned, with every probability of safety and success, where all other modes of treatment have failed.