THE OSSEOUS LESIONS OF HEREDITARY SYPHILIS.[1]

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IN the account of the osseous lesions of hereditary syphilis which I have the honour of bringing before the Pathological Society, I shall not relate the history of the question. Upon that the honourable members of this Society know as much and more than myself. In responding to their kind invitation, I wish simply to bring forward the result of my personal researches on this point of pathological anatomy, whilst exhibiting in support of them several typical specimens from my own collection.

Hereditary syphilis attacks, with a manifest predilection, on the one hand the skin—that is to say, the most superficial, most sensitive, and most vascular of organs; on the other hand the skeleton, buried deeply in the flesh, but slightly sensitive, and little vascular. The viscera and the muscles, with their appendages, only come, as regards frequency of lesions, after the external tegument and the bones, and, I may add, very far behind them. I shall only deal here with the changes of the osseous system.

I long thought that these changes were constant, and that consequently they were the most frequently met with of any in the organism. At the present time I could not be so positive, and since (by means of the scars left behind by syphilides) I have learnt to recognise the frequency of changes in the skin, I am quite disposed to admit that the latter and the skeleton are attacked very nearly in the same proportions—i.e., in the immense majority of cases. Besides, although very exceptionally the autopsy reveals no actual lesion of the bones, it may not be concluded that they have not been attacked previously, or that they would not have been subsequently; so that I still think that if my former dictum is not the precise truth, it comes very near to it.

The syphilitic changes of the skeleton are extremely various, and lead to such considerable alterations in form, colour, consistence, and structure of the organs attacked that their classification seems at first sight to be very difficult. However, the comparison of a large number of facts reveals points of contact and actual bonds of union between lesions apparently widely separated, and allows of their being classified in a methodical and simple manner. The best way not to go astray in this study is to never lose sight of the age of the patients, which is also the age of the disease. It is rare for the whole skeleton to be attacked; and certain parts are much more often so than others. These are the long bones of the limbs, and the maxillary bones; then those of the skull-cap, the ribs, the scapulæ, and the iliac bones. The vertebræ and the different bones of the foot and hand are less frequently attacked. Here I shall only deal with the bones of the limbs, notably of the humerus and tibia, as well as with the skull. Their lesions have a characteristic seat and appearance. They are of two chief kinds; one consisting in the atrophy of pre-existing tissues, the others in the development of new products.

Atrophy.—This assumes two forms. The first—much the more frequent—occurs equally on the skull and on the limbs. I have termed it *gelatiniform*, because in fact the parts attacked take on the appearance and consistence of a very aqueous fruit jelly. It is marked, to begin with, by a modification of the normal tint, which varies from garnet to rose, and from a deep citron to a bright maize colour—these different shades being moreover met with on the same bone. The marrow is glistening, transparent, and in it there occurs a gradual diminution of medullary cells, which may finally even wholly disappear, and there is found only a vasculo-fibrillar meshwork, and much water. When the hard parts are invaded, they are rapidly decalcified, the spongy lamellæ literally melt away, and are replaced by large spaces containing a tissue which has the appearance and histological structure just indicated in the altered medulla. I call the second form of atrophy *chondro-calcareous*. One knows that between the osseous diaphysis and the cartilage there is normally a layer of cartilage encrusted by lime salts. I term this the chondro-calcareous, and M. Ranvier the *ossiform*, layer. It is very thin, for it does not exceed one millimetre in thickness. In syphilitic subjects it attains an unusual thickness, and loses all regularity in its boundaries. The chondro-calcareous tissue, when existing in these proportions, denotes an arrest of ossification. The portion of cartilage bordering on the diaphysis, instead of being transformed into bone, remains in the state of cartilage, but of cartilage hardened and eburnated by the presence of calcareous salts. The vessels disappear; and instead of the osteoplasts, which characterise osseous tissue, only cartilaginous capsules are found, more or less altered, and filled with nuclear corpuscles. The diseased tissue extends from the cartilage towards the spongy part of the bone, from which it differs by a greater density and friability, and by a white colour, like chalk, which it resembles in many respects. Sometimes it occurs in isolated nodules in the centre of the spongy lamellæ, or indeed in the centre of a gelatiniform mass; for both sorts of atrophy may exist at the same time and in the same region.

Both these lead to a diminution in the solidity of the bones which they attack. The chondro-calcareous tissue is indeed much more friable than normal bone; and it is needless for me to insist on the softness of the gelatiniform substance. Each of these changes may then determine, and in fact does determine, fracture of bones; and when they occur combined, such a result is very nearly certain to take place. This fracture of bones, which is different in many respects from that observed in the rachitic period of syphilis, differs from the latter especially in its seat; for whilst in this latter case it takes place very nearly at the middle of the bone, in the other it occurs not far from the epiphysis (sometimes from one to two millimetres, sometimes one centimetre, from the cartilage), this being in relation to the place where the atrophic lesions producing it are developed. When the separation of the fragments is complete, or even very advanced, their friction produces irritation, and occasionally intra- and peri-osseous abscesses, and suppurative arthritis. These fractures have consequences clinically full of interest, and may be diagnosed during life. They produce, indeed, quite a special form of weakness, which I have termed "syphilitic pseudo-paralysis," because it simulates paralysis of nervous origin, and because it has been often confounded with such. The little patients possess an inertia, the degree of which varies with that of the lesion. In some cases it is difficult to ascertain; in others it is absolute. There is little pain. As a rule, the thoracic limbs hang down by the side of the trunk in a state of pronation. The pelvic limbs are elongated, contrary to what takes place in healthy subjects; and when the child is raised they hang and oscillate on the slightest shake. The muscles respond completely to electrical excitations. When there are abscesses, or notable displacement of the bony fragments, swellings are met with in the vicinity of the joints. It is possible in some cases, by manipulating the fractured limbs, to produce genuine crepitation. This phenomenon, together with the preservation of muscular contractility, suffices to establish the diagnosis.

The second form of syphilitic change of the skeleton, that which I call *osteophytic*, is much the more frequent. It consists essentially in the development on the surface of bones of new products in various proportions, modifying their size and causing them to undergo diverse but truly typical deformities. Two varieties must be considered, according as the tissue presents a bony hardness, or as it is fibroid and spongioid. I term the first, which may occur at all ages, the *osteoid* variety, and the second—which is never developed except in subjects more than five or six months old—the *rachitic*. To these principal alterations there are connected others which I shall incidentally describe, but which we ought to guard ourselves from making the criteria of subdivisions, for by so doing we should run the risk of great confusion. They result from an accessory morbid process which takes place together with the chief process, by it and because of it.

The osteophytes, whatever their consistence and structure, follow with tolerable regularity certain topographical laws. Amongst the bones of the limbs, those in which the change occurs most frequently and regularly are, firstly, the humerus and the tibia, which deserve a place completely apart; then the femur and the ulna. When the whole of the skeleton is involved these bones are much more affected than the rest, and when the diathesis is not of great degree it may

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happen these bones are alone diseased. On the humerus without exception (as is readily made out by means of an antero-posterior section through the length of the bone) it is the lower part of the diaphysis which is attacked, and in a much more marked manner the nearer the cartilage is approached, the change thinning out above. I have seen it in a certain number of cases completely ensheath the diaphysis. It is in the posterior aspect that the thickness of the osteophyte is most considerable. It may vary from one and a half to two, or even three or four millimetres. On the tibia the osteophyte is very frequently, if not exclusively, developed on the inner aspect, and its greatest thickness is at the middle part of this surface. To see it clearly the bone must be cut longitudinally as well as transversely. The seat of predilection of the osteophyte is, for the femur, the antero-external region; for the scapulæ, the supra- and infra-spinous fossæ; and, for the iliac bones, the external iliac fossa. The other long bones present no notable peculiarity, for the seat of the osteophytes in them is much less constant; however, in a general way it may be said that the pathological layers are especially thickened and ensheathing in that diaphysial extremity which grows the less rapidly—such, for example, as the upper end of the ulna and radius. Occasionally the osteophyte is so intimately united to the diaphysial surface that there is some difficulty in distinguishing it. But in the greater number of cases the line of demarcation is clear enough; it is enlarged even into a true medullary space. It is especially characterised by its structure, as apparent to the naked eye. It is, in fact, formed by trabeculæ which have a perpendicular or a very slightly oblique direction to the axis of the diaphysis. It may only be formed by a single layer, but in many cases several layers can be distinguished, differing in colour and texture, and often separated from one another by medullary furrows or spaces, in which small transverse trabeculæ can usually be made out, being undoubted relics of an osteophytic deposit for which marrow has been substituted. The periosteum, nearly always thickened, and that in a very marked manner, is applied over the osteophyte, and adheres to it much the more firmly the more this departs in structure from that of the bone. The constant seat of the osteophytes allows of their recognition during life, and they thus form a very valuable element in diagnosis, for there is no other diathetic condition which can give rise to them. The method of examination is very simple. In examining the humerus, it suffices to seize its lower end between two fingers, so that one is applied on the anterior and the other on the posterior surface. Then, when the children are not too fat, which is most usually the case, it is found that this extremity exceeds its normal limits in thickness. For the tibia the ball of the finger must be passed along its inner surface, which, instead of being flat, presents a kind of arch.

The following is briefly the structure of the osteophytes, and here it is that the distinction comes in which I have above made between the *osteoid* and the *rachitic* varieties. The former may exist at all ages, and before the age of six months they alone are met with. They are formed by trabeculæ more or less regular and numerous, interlaced and directed perpendicularly to the diaphysis; infiltrated, like it, with a large amount of calcareous salts, and surrounded by medulla. They only differ from normal bone in a more yellow or more rose colour, and especially in a greater friability and the readiness with which they can be punctured or cut. The microscope shows that they have not a systematic structure, like true bone; there are not to be seen in them, as in the latter, osteoplasts regularly disposed in the fundamental substance around Haversian canals; there are triangular or polygonal corpuscles, recalling the stellate corpuscles of connective tissue, anastomosing by means of processes springing from them with the periosteum, whence they emanate, and with the analogous corpuscles existing in the medullary spaces. In the spongy or rachitic form, which occurs very exceptionally before the age of six months, the osteophyte is formed by tissue which M. Jules Guérin, and after him M. Broca, have styled *spongioid*. It is nearly white, and of a pearly or slightly yellowish appearance. Its structure is essentially fibroid. It is slightly vascular, and contains but little marrow. To these two principal forms must be added a large number of intermediary varieties, from that in which the osteophyte, instead of being simple, is composed of many layers of variable structure and consistence, but always so disposed that the harder layers—those containing most calcareous salts—are the most central, that is to say, the nearest to the diaphysis; whilst the most spongioid and most deprived of calcareous matter occur at the periphery immediately beneath the periosteum. And it can be seen, from this disposition, that the second form is derived from the first, since between them can be marked a series of intermediary conditions which pass insensibly from the one to the other. During this time the diaphysis is but slightly modified in very young subjects with osteoid osteophytes; but in others it becomes decalcified, splits up into parallel lamellæ by the development of furrows filled with marrow. Lastly, it may undergo the spongioid transformation, and it then becomes extremely light, porous, and friable; and when it has lost its soft parts by maceration, it has, so to speak, neither weight nor form. With the osteoid osteophytes the cartilage is but little changed; the chondro-calcareous layer only is thicker and more apparent; but in proportion as the change tends towards the rachitic form, the chondroid layer increases, and eventually even takes on considerable proportions, becomes filled with outgrowths of the diaphysial spongioid tissue, and is vascularised in a very marked manner. There thus results a swelling, sometimes of enormous size, of the articular ends of the bones; and that forms one of the best signs of the rachitic variety of hereditary syphilis.

These changes in the skeleton lead to grave results. Decalcification, lamellation, spongioid transformation, diminish and even destroy its solidity, and render it unfit to fulfil its principal function, which depends on its resistance and rigidity. Hence occur curvatures, partial or complete fractures, deformities of all kinds of the limbs, the vertebral column, or thorax. Then ensue disturbances of functions, sometimes of considerable degree. Walking is retarded or impossible; the movements of the lower limbs are difficult; abnormal attitudes are produced; respiration is difficult, because of the flexibility and fracture of the ribs, and of the slight resistance offered by the thoracic cage to the action of weight. In one word, there is a state of powerlessness, which in cases where the disease is extreme attains dangerous proportions.

This is what may be said of the course of the lesions already described, at least in part, and upon their termination. So long as the diathesis is active the osteophytes increase at the periphery, whilst often they are destroyed at the level of the preformed parts, replaced by medulla. In the period of repair, when all tends to return to the normal, at the same time as the primitive bone with which they are perfectly combined, and the nutrition changes of which they share in, they tend to take on all the structure, appearance, and attributes of healthy bone, and that by means of a simple enough series of changes. In the greater number of cases, by reason of those changes, which the evolution of the skeleton (so rapid at this age) actively favours, all trace of the disease disappears. But it is not always so, and there are subjects upon whom indelible marks of the disease remain. In this category are torsions, curvatures, fractures with all their consequences, and even osteophytes, notably when these are seated on the cranial bones.

The cranium undergoes the changes which have just been described, but in proportions and with peculiarities special to it. Gelatiniform atrophy is rare in it, yet it is to be seen in very young infants, and I am inclined to believe that it may commence in intra-uterine life. It begins, without exception, peripherally—that is to say, under the periosteum, and only reaches to the dura mater in very rare cases, and when the disease is intense and rapid. I have only once seen that take place, and at the seat of perforation there was developed a partial meningitis. Commonly, the lesion, whether circumscribed or diffuse, is not very deep. To appreciate it well, the specimen must be dried immediately or after maceration. Then are seen the thinned-out surfaces resembling wormeaten wood or cloth. More rarely the loss of substance appears just as if it had been made with an *emporte-piece*. All the bones of the skull-cap may be attacked. The diagnosis of this lesion cannot be made during life.

The cranial osteophytes have a great practical interest. Never observed at the same time with gelatiniform atrophy, they are only developed in older children. They occur very nearly exclusively on the periphery, and at the commencement always in the same points—viz., the peribregmatic regions (i. e., around the anterior fontanelle) of the frontal and parietal bones. More rarely they start from the temporals. They are very rare on the orbital arches and the occipital bone. They are only observed when the disease is of great

intensity. They are at first lenticular elevations, red, violet, or greyish in colour,—rising very abruptly from the outer table, porous and spongy, sometimes hard, very seldom smooth like the normal bone. The cranial osteophytes extend little by little from their point of origin to the neighbouring parts, either preserving their original form or becoming elongated, or, indeed, assuming a crescentic shape. The frontal and parietal eminences are the last regions to be invaded, but it may happen that finally they are so, and then the entire vertex of the skull is covered by the osteophyte. The sutures themselves are united, which much modifies the development and the dimensions of the cranial cavity. The osteophytes increase in thickness, and in the most diseased parts may attain two and even three centimetres in thickness. When the diathetic influence is exhausted, the morbid tissue becomes harder and denser from the shrinking of its medullary spaces, and from the accumulation of a fresh amount of calcareous salts. In some cases the weight of the skull notably exceeds the physiological mean. The cranial osteophytes are peculiar to hereditary syphilis. They determine morphological deviations nearly always to be appreciated during life. Among its usual forms there is one which is very common and quite characteristic. It consists in the presence of two or four eminences disposed around the bregma (fontanelle), and separated by two furrows in the form of a cross; the one transverse, directed along the coronal suture, the other antero-posterior, along the sagittal suture. When these eminences are very prominent, and sufficiently extensive, a typical condition is the result. I have termed the skull thus deformed *natiform*, on account of the resemblance which its elevations present to the parts styled in Latin the *nates*. The premature union of the sutures determines the prominence of the bregmatic region, and an arrest of encephalic development, whence may result idiocy, as I have once observed.

In its spongioid period hereditary syphilis leads to still other modifications of the skull. I allude to *plagiocephalus* and *craniotabes*. Plagiocephalus cannot be produced apart from habitual decubitus on the same side of the head, but syphilis favours its development. Craniotabes also is primarily caused by prolonged dependency of one part of the skull, and it is frequently enough seen apart from syphilitic rachitis; but this latter is, without contradiction, of all the maladies of the organism, that which, combined with decubitus, provokes it in the surest and most marked manner. When both osteophytes and tabetic perforations occur at the same time on one skull, which is not rare, the two lesions always exist on points diametrically opposite. For whilst the former occupy regions of the skull which are uppermost during decubitus, the perforations, on the contrary, are found on the undermost part, that which is most directly submitted to the action of weight.

The knowledge of the cranial changes produced by hereditary syphilis has enabled me to determine two points of historical pathology. The first is that syphilis existed in certain parts of South America before the European conquest. The truth of this proposition is indisputably demonstrated by three specimens. Two belong to the museum of the Société d'Anthropologie; they are the crania of young children found by M. le Dr. Destruges at Guyaquil (Ecuador), together with objects manifestly of American origin; they have on the frontal and parietal bones osteoid osteophytes precisely resembling those which I have described. The third is an adult cranium, in the museum collection; it was found at Chancai, a few leagues to the north of Lima (Peru); the objects from the place of interment in which it was found do not, according to the opinion of most competent archæologists, show any trace of Spanish influence; and all favours the view, according to the opinion of M. Ernest Hamy, that the remains at Chancai are undoubtedly anterior to the time of Pizarro. The second historical fact is the existence of syphilis at the epoch when the Dolmen populations dwelt in the centre of France. Owing to the courtesy of M. le Dr. Pruniers, of Marvegols, to whom we owe so many interesting anthropological discoveries, I have been enabled to examine three fragments of skulls from young subjects coming from the dolmens of Cauquenos and Bourassac in La Lozère. I have ascertained in them the existence of osteophytes, wholly resembling those which are produced at the present day by hereditary syphilis, and which can leave no doubt as to the existence of the disease in those remote times.

There should remain for me to speak of the changes of the dental system; but upon this latter point I am free to confess my studies are not yet sufficiently advanced. However, they go so far as to allow me to affirm the importance and the accuracy of the observations which the illustrious President of the Pathological Society, Mr. Jonathan Hutchinson, has made on this subject.

NEW CASES OF FILARIOUS DISEASE.

BY J. BANCROFT, M.D.

I PREFACE this communication by a few additional remarks on the cases in my paper read before the Pathological Society on May 21st, 1878.

No. 2 was electrified by the magnetic machine, and made ill. Chyluria continues and excessive appetite. A mosquito that had bitten this patient contained a filaria.

No. 3. Chyluria and hæmaturia at times severe.

No. 7. Girl aged nineteen. Chyluria. Filariæ seen in blood. Chyluria ceased. Married, and in February, 1879, was delivered after hard labour by midwife. I saw her after labour; a vaginal polypus-like growth was observed, which patient had noticed for a long time. This I cut off. A blood-clot the nurse had saved I examined for filariæ, and found them abundant. The child died shortly after birth. I cut into the scalp tumour, removing about two ounces of blood. In this there were no filariæ.—N.B. Filariæ did not travel from the mother's blood to that of the child.

No. 8. Tabes; severe fever occasionally.

No. 10. Painful state of shoulder.

No. 14 died three months ago in distant town with great disorder of the chest. Surgeon who attended him had seen nothing like it before. No post-mortem was made.

No. 25. Boy, recovered from operation after severe pelvic abscess. Now the brachial, radial, and ulnar arteries have ceased to circulate blood. He had a severe febrile attack a short time ago lasting four days. No filariæ to be seen in the blood.

No. 27. Chyluria continues. Filariæ in blood.

NEW SERIES OF CASES.

No. 1. Boy, aged eighteen, farm labourer, admitted into Brisbane Hospital in 1878 with elastic tumour of upper part of right thigh. A seton was put through with no particular result. Filariæ were found in blood of the part. On re-admission in December blood of the arm examined; contained no filariæ. Tumour galvanised by Gaiffe's chloride of silver apparatus strongly daily for a fortnight; also by the electro-magnetic machine. On tumour being punctured filariæ exuded. Several ounces of blood taken from the arm contained no filariæ.—February: Soft tumour now diminished, and leaves several hard glands about size of large peas. Patient otherwise well. Hard glands not punctured to determine existence of filariæ in them. Possibly cured.

[Nos. 2 and 3 have been omitted in Dr. Bancroft's manuscript.—ED.]

No. 4. Boy, aged nineteen; labourer. Unsteadiness of hands, twelve months, worse for six months. Was ill five years ago with abscesses, chiefly on left side. Has been obliged to give up a situation in which the use of the pen was required. Can scarcely sign his name; requires very great care, and the writing looks like that of an old man of seventy. The abscesses he had had caused me to examine his blood, in which filariæ were particularly abundant. I directed this patient to catch any mosquitos that had bitten him in the night. In the first mosquito examined I counted forty-five filariæ.

No. 5. Boy, aged eighteen; farm labourer. Feb. 13th: Chyluria, with bloody admixture at times. Had abscess of right groin six years ago, abscess of left two years ago. Two attacks of pain in testicles since Christmas; they become drawn up; he then sweats, afterwards shivers for about half an hour, then has hot skin and headache, which prevents him working for two days. His hands have a peculiar numbness, which he experiences at times, and a sensation as if rain were falling on them. I notice no anæsthesia. Blood from scrotal vein contains no filariæ. Urine sets in a trembling jelly, and contains no filariæ.

No. 6 in this new series is the case of leprosy with filariæ in the blood previously sent to Dr. Cobbold, and published in THE LANCET of Feb. 1st of the present year.

Brisbane.