ON THE

REMOVAL OF TUMOURS FROM BONE.

BY

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I do not doubt that many surgeons have removed tumours growing in bones by extirpating or enucleating them from the cavities in which they lay, yet I believe that the practice has never been generally approved; it has been and is thought, at the best, sometimes permissible. The belief seems to be that when a tumour grows in a bone, the proper course is to cut away more or less of the bone together with the tumour, even although this may involve the loss of a limb, or some great deformity such as that due to the removal of a piece of the whole depth of the lower jaw, or the whole of an upper jaw, including its alveolar border with the teeth.¹ Many cases, however, have convinced me that the operation of simply removing a tumour from the place in which it lies is as sufficient for the cure of one growing in a bone as for

¹ Illustrations of this general belief may be found in considerable numbers in any large pathological museum.

that of one growing in connective tissue, and that the instances are very few in which it is right to disturb the continuity of a bone in order to remove from it any innocent tumour.

On pathological grounds this practice ought to be right for all the non-cancerous tumours which, growing as circumscribed masses within bones, expand them into shells or cases. For these, to many of which the name Endostosis, or Osteosarcoma centrale, has been given, are, in all their connections with surrounding parts, just like the fatty, fibro-cellular, glandular, and other tumours which, growing in soft textures, expand them and are so loosely associated with them that they may be cleanly shelled-out. In the cases of these tumours in soft parts, the practice is to excavate or enucleate the tumour from the space containing it: so should it be for nearly all the tumours of the same class growing in bones.

In illustration of the practice I give the following cases selected from many of the like kind.

CASE 1.—A lad of 16, with good general health, was admitted, in 1865, into St. Bartholomew's Hospital, with a swelling just below the tubercle of his tibia, which he had observed increasing for eighteen months, and rapidly during the last six. The swelling presented a smoothly rounded surface, bulging from the front of the tibia, rising about two thirds of an inch, and measuring about two inches across. The surface yielded a little, and without pain, to firm pressure; its borders were the hard walls of the tibia. There was no other appearance of disease.

Believing that this was either a myeloid, or, more probably, a cartilaginous, tumour within the upper part of the tibia, I uncovered it by reflecting a semicircular flap of skin, and cutting open the subjacent periosteum. I was then able to remove with a gouge a mass of compact semi-transparent cartilage nearly two inches in diameter, in general and minute characters just like ordinary foetal cartilage. The cavity in the tibia in which it was lodged was bounded by smooth, hard bone, and was about an inch deep.

No serious trouble follows the operation. The wound slowly healed, with a scar depressed deeply into the cavity into the tibia, and within the last six months I have seen the patient in perfect health, in no degree damaged by the operation.

CASE 2.—In 1865 I removed a similar cartilaginous tumour from the lower jaw of a lady, 45 years old. It had been growing during two or three years, extended along the space between the first bicuspid and last molar teeth, was deep set in the jaw, expanding both the walls, and rising to about the level of the molar teeth. I gouged it out, leaving the base of the jaw untouched and not cutting any part of the cheek or lip.

The patient has remained well since the operation, and has no outward appearance of anything having been done.

CASE 3.—A woman of 40 has lately left St. Bartholomew's, who was admitted eight weeks ago with a large tumour at the lower end of the right radius, which had been observed for about five years, and in the last year had quickly increased, ulcerated, and given great pain. The tumour, projecting chiefly from the outer and dorsal part of the forearm, immediately above the wrist, was of irregularly globular form, coarsely nodular, very firm and tense, about three inches in its chief diameters. The wall or periosteum of the radius appeared continuous over its surface. The integuments over it were dusky, congested, hot, and in two places widely ulcerated. The wrist-joint was free, but its movements and those of the fingers were hindered as if by the bulk of the tumour, and its displacement of tendons.

There was no difficulty in making the diagnosis of a cartilaginous tumour growing in and protruding from the lower end of the radius; but it seemed doubtful whether the tumour could be so excavated from the bone as to leave anything that would maintain the length and firmness of the forearm, and not spoil the wrist-joint. It was judged right to make the attempt.

The tumour was exposed by a long incision along the

direction of the extensor tendons of the thumb and the removal of the ulcerated portion of the integuments in this direction. On uncovering the tumour it appeared that the greater part of it was protruded from the radius, or only thinly covered by its outstretched periosteum. The lower end of the radius was filled with the smaller part of the tumour, a mass rather more than an inch in diameter, by which its walls were thinned and extended, and its articular cartilage nearly uncovered. The protruding part of the tumour was broken off, and then that which was within the radius was gouged out. A very thin shell of bone and periosteum was left, widely open at its outer and dorsal part. The radio-carpal articulation also was laid open by the breaking away of the radial articular cartilage from the thin shell of remaining bone.

The hand and arm were put on a splint, and constantly irrigated for many days. Parts of two of the short extensor tendons of the thumb sloughed away; but there was no serious hindrance to the healing of the wound, and the hand appears likely to become completely useful.

CASE 4.—A healthy lad, 19 years old, was under my care in St. Bartholomew's in January, 1861, with a swelling on the left side of the face, which pushed his eyeball nearly half an inch upwards, and the lower border of the orbit and the lower and front part of the antrum as much forwards. The nasal cavities, palate, alveolar border of the jaw, and the teeth, all appeared sound. The swelling was enclosed by the bony walls of the antrum in every part except the floor of the orbit, where a very firm, elastic, roundish tumour could be felt distinctly pulsating. The swelling was not painful and all the textures adjacent to it were quite healthy. It had been observed for seven years, and projected first in or just below the orbit.

It was sufficiently clear that there was in this case a fibrous or a myeloid tumour pulsating at its place of escape from the bony investment of the walls of the antrum.

I cut through and raised the cheek from the whole front of

the upper jaw, then cut away all this part of the jaw and the lower border of the orbit, but without touching the alveolar border or the teeth. Part of the front of the tumour growing from the inner surface of the anterior and inner wall of the antrum was thus removed. The rest of its attachments were then cut away, and its posterior part was easily enucleated from the soft structures of the orbit and sphenomaxillary fossa on which it lay imbedded.

The tumour was an oval, tuberous mass, from two to three inches in its several diameters, very dense, heavy, elastic, and perfectly defined. It consisted throughout of close, compact white fibrous tissue.

The healing of the wounds was tedious but not attended with danger, and, the teeth being undisturbed, the consequent deformity was very slight.

The patient, as I am informed by Mr. Isbell, of Ross, who sent him to me, has remained to this time in perfect health.

CASE 5. [I am indebted to Mr. Wrench, of Bakewell, for the notes of this case.]—E. W—, aged 43, a married woman, childless, very stout, and rather hysterical, was always (as she thought) healthy, till, in March, 1868, she believed she sprained her left wrist. Soon after this time she felt pain in the wrist, and then swelling appeared and she was treated with leeches, blisters, &c., as for a sprain.

Mr. Wrench saw the case first in July, 1869. There was then considerable enlargement of the lower two inches of the radius, and in all this part pulsation could be distinctly felt and seen, but could be stopped by pressure on the brachial artery. The hand was nearly useless, and the pain constant.

In the belief that the swelling was due to aneurism in the bone, ice was applied and digital compression of the brachial artery, and on August 5th this artery was tied. For some months the swelling lessened, the pain ceased, and the hand was again useful. In December, however, all the old symptoms reappeared, and Mr. Paget, in the belief that the

swelling was due to a pulsating myeloid tumour within the distal end of the radius, recommended its enucleation.

The operation was performed by Mr. Wrench at the end of 1869. An incision four inches long was made over the radius, between the tendons of the extensors of the thumb, and a part of the tumour was exposed covered only with periosteum. The tumour was too friable to be removed entire, but it was all easily broken down with the finger, and removed from the irregular cavity which its deeper-seated part occupied in the end of the radius. The wrist-joint was not exposed, and no vessel required ligature.

Severe inflammation at and about the seat of the operation ensued, and very free suppuration, but in about two months the wound was very nearly healed, and at the end of a year only a small sinus remained, through which it seemed likely that a portion of dead bone might come. All pain had ceased; the destroyed part of the radius appeared to be replaced by firm new bone; there was no enlargement, and only very slight deformity at the wrist, and the hand was becoming constantly more useful. The movements of the wrist and of all the fingers were restrained, but none were lost and all were improving.

CASE 6.—In October, 1868, I saw with Mr. Edgar Barker, jun., a patient, 15½ years old, who had a considerable swelling at the right angle of his lower jaw. This had been observed for only two months, but attention has been drawn to it chiefly because of suppuration which had occurred in it about the time when it was first observed. The swelling was smoothly rounded, not painful, bounded everywhere by bone except at the gum; and here a small opening, through which some pus escaped, would admit a probe into contact with bare bone.

The case appeared to be one of expansion of the angle of the jaw around a suppurating capsule of the last molar tooth, and with Mr. Barker's help I intended, with a gouge, to lay the cavity open through its alveolar wall. But I found that the swelling was due to a circumscribed bony tumour, which

with some difficulty, I enucleated. It was from two thirds to three fourths of an inch in its diameter, and composed of hard, finely cancellous bone, around which the walls of the jaw were extended.

No serious consequences followed the operation. The swelling subsided, and the patient remains well.

These cases, to which I could add several more, are enough to prove the sufficiency and safety of simply removing innocent tumours, of whatever kinds, from bones. The sufficiency is established by the times that have elapsed since the operations without any recurrence of disease; times which, in even the shortest cases, are more than would have passed if recurrence should have happened in consequence of incomplete removal of disease. And I have seen no reason to doubt that the safety of removing a tumour from within a bone is greater than that of any resection or amputation that might have been performed as an alternative operation.

It is hardly necessary to describe how tumours should be enucleated from bones. A tumour, being very freely exposed in any way that its size and situation may make most advisable, may be enucleated with the finger or a gouge, and with gouges of various sizes any portions that lie in recesses from the main cavity in the bone may be scooped out. Of course, if it be possible, every portion of the tumour should be removed, but there need be no fear of recurrence from the growth of microscopic remnants, and it is not necessary to cauterize the walls of the bone-cavity which contained the tumour.

The only real difficulty is to make a correct diagnosis of the cases for which the different operations for the removal of tumours growing in or on bones are severally appropriate. For cancerous and recurrent tumours, amputation or wide resection is generally advisable; for innocent tumours growing on bones, excision; for innocent tumours growing in bones, enucleation.

For help to the diagnosis necessary for choosing the right

operation for bone-tumours I venture to offer these conclusions from many observations.

1. The tumour is probably cancerous if its growth commenced before puberty or after middle age, unless it be a cartilaginous or bony tumour on a finger or toe or near an articulation.

2. If a tumour has existed on or in a bone for two or more years, and is still of doubtful nature, it is probably not cancerous or recurrent, and this probability increases with the increasing duration of the tumour.

3. If a tumour on or in a bone has doubled or more than doubled its size in six months, and is not inflamed, it is probably cancerous or recurrent, and this probability is increased if, among the usual coincidences of rapid growth, the veins over the tumour have much enlarged, or the tumour have protruded far through ulcerated openings and bleeds and profusely discharges ichor.

4. If with any such tumour, not being inflamed, the lymph-glands near it are enlarged, it is probably cancerous, and still more probably if the patient have lost weight and strength to amounts more than proportionate to the damage of health by pain, or fever, or other accident of the tumour.

5. A tumour on the shaft of any bone but a phalanx is rarely innocent, and so are any but cartilaginous outgrowths on the pelvis, or any but the hard bony tumours on the bones of the skull.

If on the concurrence¹ of these characters, or on other grounds, it is in any case concluded that a tumour connected with a bone is not cancerous or recurrent, the question whether it is growing on or in the bone may be probably determined by the following general rules.

When the wall of the bone can be traced over the surface, or any part of the surface, of the tumour, its growth from within is nearly certain. And so it is when, on the surface of the tumour, portions of bone can be felt among portions of more yielding substance. General smoothness of surface

¹ I say "concurrence," for in these, as in all other instances, there is no one sign which can be always or absolutely relied on for diagnosis.

is usually significant of a tumour growing within a bone and expanding it, unless in the case of cartilaginous tumours, which after growing within bones, have protruded through some part of their expanded walls. Pulsation in a non-cancerous tumour connected with bone is a nearly certain sign of growth within bone, except in the case of certain specimens of myeloid epulis; and when such pulsation is felt it is no indication that severe bleeding will ensue in the removal of the tumour, for it is only derived from the arteries on the walls of the bone-cavity lodging the tumour.

When these means of diagnosis are insufficient, an exploratory puncture or incision may be made; and, generally, in cases of doubt, it may be well to attempt the simple removal of the tumour, and in case of failure to proceed at once to its excision or to resection or amputation.